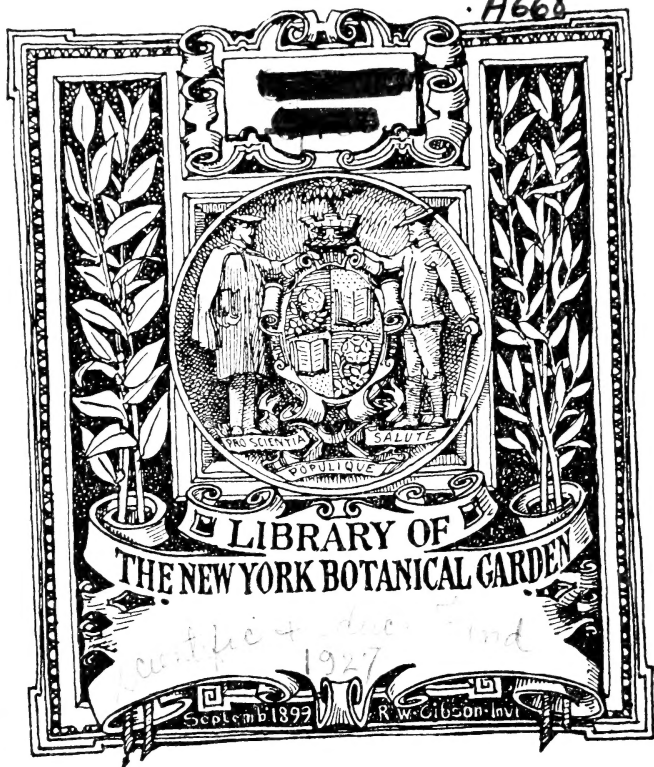
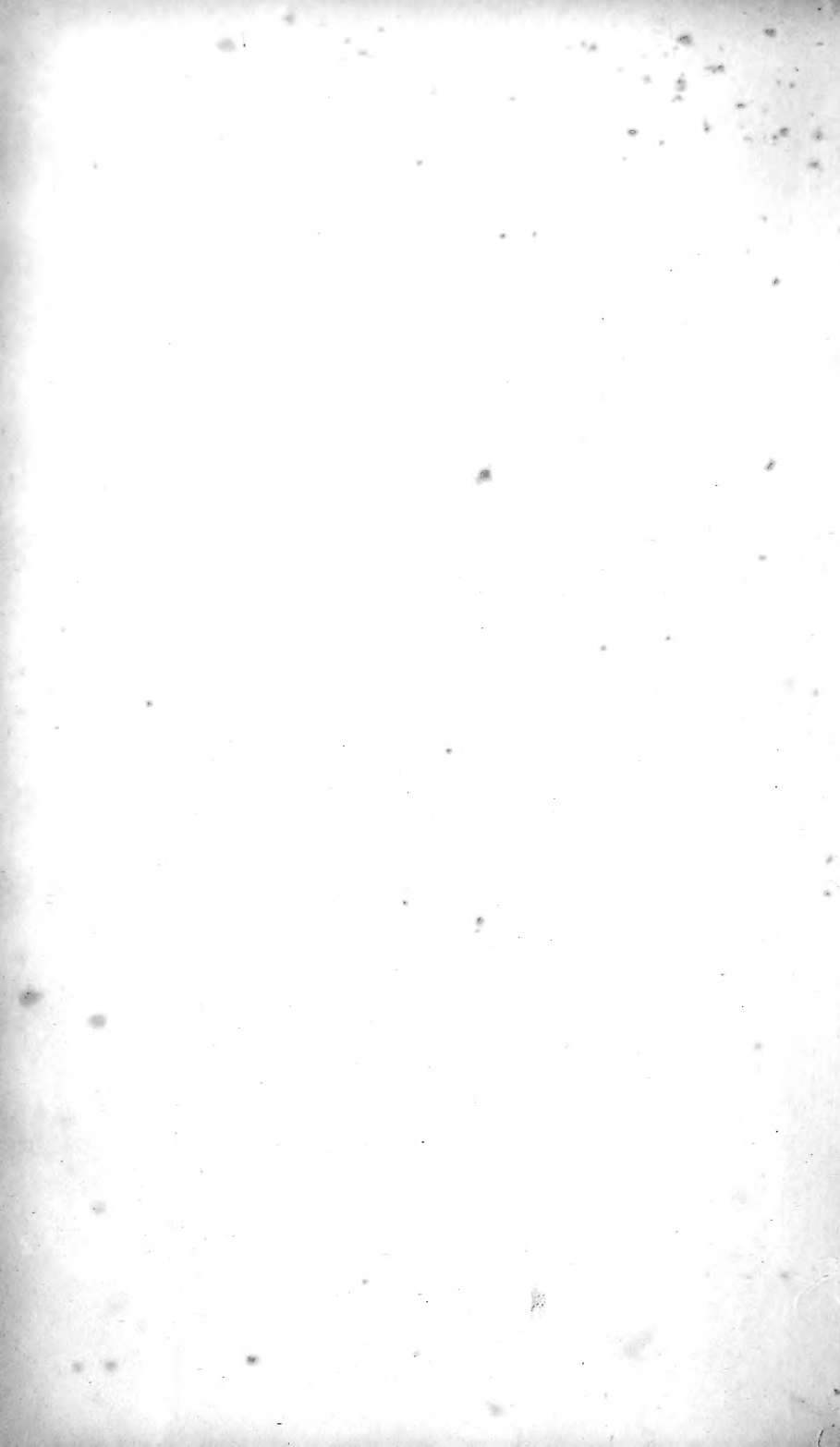


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THE
G A R D E N E R

A M A G A Z I N E
OF
HORTICULTURE AND FLORICULTURE

EDITED BY
DAVID THOMSON
DRUMLANRIG GARDENS

1879

WILLIAM BLACKWOOD AND SONS
EDINBURGH AND LONDON
MDCCCLXXIX

AGG8
vol. 13
1879

THE GARDENER.

JANUARY 1879.



OUR SUPPLY OF APPLES AND PEARS.



It is the opinion of some, that the production of Apples and Pears in the United Kingdom has ceased to be a matter of much importance, now that the Americans can pour these fruits into our markets and shops so speedily and in such enlarged quantities. Fruit is now sent on to us some seven or eight thousand miles across the Rocky Mountains, and three thousand miles by sea, in good quality and condition, in a comparatively few days; and that certainly may be ranked among the facts that are stranger than ever fiction anticipated. Our French neighbours also cultivate these fruits to make up the deficiency of our home produce. It is well that these sources can be looked to for a supply of such wholesome fruits, which in the case of Apples can be purchased at a rate that enables the frugal peasant or artisan to enjoy the wholesome supplement of tarts and puddings. The question, however, arises, Ought we to be so dependent on foreign sources for a full supply of these fruits? This, like every other question, has doubtless two sides to be looked at; but our object at present is not to discuss it in the abstract. Our conviction is, however, that our home production might be much more satisfactory than it at present is, even in spite of many adverse circumstances.

Some writers have assumed and tried to prove that the climate of this country has changed so much for the worse that Apple crops are not now what they formerly were. This we believe to be an assumption that has no foundation either in statistics or anything else, and is repudiated by the recognised fact that drainage and high cultivation have had rather a beneficial influence on our climate. Be

that as it may, we have no more doubt that many districts in the United Kingdom could be made much more productive of these fruits without entrenching on lands remunerative in other ways, than we have of our own existence. The question may be asked, By what means? Of course, to begin with, by planting more trees. This may be met with the assertion that there never were so many trees raised and planted as there are in these times—a statement that may be true. But is it not near the truth that much of the planting might as well be left undone, and many of the trees might just as well be burned, for any share they have in increasing the supply of fruit?

We must of course endeavour to give a reason for this last assumption, as it may be termed. In the first place, we have never yet had to do with Apple and Pear trees in any district, without having the fact that the supply of fruits in five years out of six has been borne by a comparatively few sorts very forcibly illustrated. This observation is not by any means singular to any cultivator; and we believe if it were more carefully considered, and only those productive varieties planted all but exclusively, the bulk of fruit produced in a very great number of localities would be increased fiftyfold. As an instance of this fact, we now practise in one of the very worst spots that could be chosen for hardy-fruit culture—*i.e.*, a low damp valley close to a river, with a heavy soil on a clayey subsoil, and an average rainfall of fifty inches, and where spring frosts are very prevalent. Yet only twice in ten years has the yield of Apples not been sufficient for the supply of one of the largest establishments for three months, and from comparatively few trees—under what we consider adverse circumstances—in the vegetable-garden alone. We are now so well acquainted with the few varieties and trees that are productive, that we could venture to point out those that are likely to be fruitful the following season; and the varieties could be more than counted on our fingers. If every tree in the gardens were of these varieties, there would be supply enough for eight or nine months of the year. The blossom produced by other varieties is most encouraging, but their crop is almost always *nil*. Is it therefore not reasonable to expect, that if those varieties that bear thus were largely planted in this and similar districts, the produce would be much increased with the self-same labour in culture? The same rule we have noticed to apply more or less to other districts. The indiscriminate planting of varieties not suited to localities has been found out by market-growers to be a great mistake, and they are now acting on the principle of selection.

Another practice, and, considering its results, one that has been adhered to with an amount of tenacity that is remarkable, is that of

planting Apples and Pears by the sides of walks, in what are termed cross-borders, in kitchen-gardens, and even dotting them about in vegetable quarters—the spaces of ground between trees in these positions being frequently occupied with biennial and other flowering plants, and sometimes with Strawberries and vegetable crops. These borders, if devoted to flowers, are rarely properly manured, and are deeply worked with a spade annually among the plants, and close up to, if not over, the roots of the trees. If devoted to vegetables, they are, on the other hand, heavily manured with ordinary dung, deeply dug into the soil. To escape mutilation, the roots of the trees, with a sort of self-preserving instinct, proceed to find peace and comfort in too often an unsuitable and canker-breeding subsoil. In the one case the roots are starved, and in the other too grossly fed; and the respective results are stunted growth and poverty-stricken produce in the one case, and in the other too gross a growth of unfruitful wood, to be annually and ruthlessly cut away with the pruning-knife. Of these two evils it would be difficult to say which is the worst or most unreasonable.

Trees in such positions as the one named must of necessity be kept in very restricted limits as to size, or injury to the things among which they are planted would be greater than it really is; and even with all the restriction practised, the one crop is most injurious to the other. To make matters bearable, the pinching and pruning are carried to an injurious excess every year, leaving as many knife-wounds as make it a wonder that decrepitude, canker, and decay are not more fatal than they are. The pruning of such trees, after the fashion of the present day, is an evil; and it is to be feared that in not a few cases it is resorted to to permit of the other evil of making room for growing every conceivable variety in a given space. Root-pruning every two or three years is perhaps the more reasonable course to pursue; but if trees are to be grown with a vigour capable of bearing a full crop of decent fruit, it is a process that can only be carried to a certain extent, and that not sufficient to do away, under the circumstances, with the murderous pruning which leaves trees more conspicuous for their number of knife-wounds than for anything else.

This miniature-tree system, mixed up with other crops, is, generally speaking, not satisfactory. It is a sore evil to other kitchen-garden crops, and leads to so much cutting and restriction, that it never will admit of a satisfactory supply of fruit, even if the selection of sorts be ever so suited to the locality. In so important a horticultural matter as this, it is strange that we adhere so tenaciously to the mixing of fruits with other crops: and the evil is most flagrant in what are termed the best of gardens; and hence the faithfulness with which it

has been copied. For those with only one small piece of ground, there is some excuse if they desire a few varieties. But even in their case their trees would do better located by themselves.

There is no serious reason that we know of why there is so much of this mixing up of standard fruit-trees with kitchen-garden produce, instead of putting them by themselves, where they and the ground can be much more specially treated in accordance with their wants. By doing so, many telling advantages are gained for both departments. The evils of digging heavy dressings of rank manure, and of digging among the roots of the trees, find no excuse, and can be entirely avoided. Neither need the trees be starved or injured by being improperly fed when they want extra nourishment. No spade or fork should be thrust among the roots of trees to dig in manure and mutilate the roots. A firm surface, subject to no more tillage than is necessary for a clean surface, having the necessary manure spread on its surface, inducing the roots to keep near it and be fed with the beneficial elements of, instead of coming in contact with, the manure—this way of managing the soil produces a more moderate growth, and altogether that state of health without grossness which is so desirable.

Then the trees, to be worth the name, can have room and liberty to develop without injury to other crops and with benefit to themselves. The pruning is reduced to a minimum sufficient to admit of light and air to the various parts of each tree, instead of the stag's-horn style of pruning off almost every inch of wood made annually. The compromise between nature and art mutually working to each other's hands results in the building up of trees that frequently do more to fill fruit-rooms with fine fruit than when they are managed on the other principle which we are contrasting.

Besides, trees in an orchard give an amount of shelter to each other that is an important factor in securing comparative safety from the blighting influence of winds, which do so much damage to the blossom. By observing these few cardinal points more generally—the proper selection of sorts, the orchard system of planting, natural root-culture, and less pruning—much more and better fruit would be produced in a great many districts. The culture would be simplified and the labour lessened. On the other hand, the vegetable-garden would also profit by such an arrangement to no inconsiderable extent. This, coupled with the planting of many a nook of ground now not much better than waste, would very much increase our home supplies, as compared to what is grown in *gardens*, making us more independent of foreign supplies of at least the commonest, though not the least useful, of these fruits, which it is desirable to make still more plentiful, cheap, and popular among our toiling millions.

HARDY FRUITS.

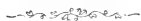
THE importance of cultivating these under a recognised system to give the best results is not at all so general and successful as might be expected. From the amount of information scattered broadcast by every garden periodical and standard work on pomology, one would almost suppose that any advice on the matter is wellnigh superfluous. But there are so many villa-gardeners, young amateurs, and others continually entering into the list of cultivators, that there is a continuous demand for "simple guides and instructors," so that no apology need be offered for devoting a paper entirely to this interesting subject. We say "simple guides"—any others are useless, and disregarded by the most of readers. To give the most information in fewest words is why the advanced writers on horticulture are accepted as real teachers; and all who aim at eloquence and profound language when teaching horticulture defeat the object entirely which they have in view. We know as a fact that much of the very long letters on horticultural subjects is passed over and remains unread by those who are thirsting for knowledge, time being too precious to wade through words.

Some of the evils most generally met with in fruit-gardens and orchards are crowding of the branches, allowing the trees to grow away at first into gross spongy wood—all pith, which does not ripen and cannot bear fruit—badly drained land, woods belted closely round the trees, so that they get very little fresh air, and roots getting away from the surface-soil into a cold and barren subsoil, when canker takes place, and probably death. Where soil is very suitable for most kinds of fruit, as in this county (Worcester) and two or three others, the attention given, except in comparatively few cases, to high-class cultivation is rare, the soil and climate accomplishing so much without the aid of cultural skill; but when the practice is of a scientific character, as may be seen in a high sense at Rev. Canon Lea's orchards at Droitwich, where every system of culture except on walls is represented, the crops are invariably heavy and the trees healthy, especially Plums, Apples, and Pears. Crowding must be prevented by pruning out the branches and lifting the trees, in their younger stages, out of the soil, and transplanting them afresh. Cutting the roots off indiscriminately, often with a spade, is barbarous work. Where they are long, naked, and grown far from the space allotted for them, the knife may be carefully applied at lifting time (when the growth of wood is nearly finished and the leaves about to fall). A tree of bush form should be opened out in the centre to allow light and air to have full power in ripening the fruit-buds,

which are, of course, prepared the previous season. Badly-drained land, especially if in a low and flat position, must have main drains and cross ones leading to them, and the whole taken with a fall beyond the orchard or garden to some distance. If air or light is kept from the trees by plantations or other means, it is useless to attempt to do justice to both—though trees as “break-winds,” at a proper distance from an orchard or garden, are advantageous. Barren subsoil can be kept in its place and the roots out of it by a proper system of lifting and mulching. Tap-roots are evils which should not be allowed to exist. Timely attention to young trees by lifting them, or concreting the holes at planting time, will save disappointment, by giving fibres instead of huge thongs of roots which draw up a superfluous amount of water. Mulching of trees with good manure attracts the roots upwards, where they can have the benefit of sun and healthy soil. Planting of the trees is a very important operation, the best season being October and November; but trees are often seen in good health and bearing plenty of fruit which have been planted at all times between September and May. We have lifted and transplanted trees with roots in a mass of fibre with success during the dog-days; but such cannot be a general practice. At the present season, if planting is to be done, we would say, wait till near the time of the sap flowing, when the buds begin to swell; the roots then push into new soil, and little check is sustained. Meanwhile the trees should be chosen in the nursery grounds; and if weather is dry and suitable, the ground may be prepared for the trees. We have planted a new garden and orchard of goodly size within three years (besides a number of small new ones), and during this season a good old garden and orchard has been renovated, and planted with choice collections of fruit-trees. The two places are very differently situated—one on the west coast of Wales (the old place), and the new one in a beautiful part of Worcestershire. The Welsh place is low and flat, only a few feet above the level of the sea, the soil light and gritty. The gardens and orchard are enclosed with dense woods, and no doubt have been ruined for want of fresh air. The new garden is high and dry, fairly sheltered, and soil of the most tenacious description. The system of preparation for planting as a necessity is widely different. Trenching in the first place is necessary for both situations—two spades deep, and the bottoms turned over roughly. The holes are made a good width (the roots being spread out as far as they would go), a quantity of brick and lime rubbish was worked into the bottoms of the holes, and a quantity of fresh loam added to each hole. In the old place the trees are planted high above the surrounding flat and low ground, well mulched, and the surface above the roots

left rather flat. In the new place the ground was not raised at all (except slightly for the wall-trees); and though many of the trees were planted so late as May (all the wall-trees at end of April), and they have been all lifted or half lifted, the most of them bore a useful crop last season. Some of the kinds were very heavy after being thinned. Preparation for the trees has special advantages when done suitable to soil and locality. In these two places two opposite courses had to be pursued, the one lot of trees being in danger of suffering from drought, and the others in danger of being destroyed by wet—the rainfall being great, as well as the position being low and flat. The same preparation holds good for all kinds of bush-fruits, as well as for larger trees; and whatever is done let it be well done, as lost labour and disappointment too often follow hasty preparations. In choosing kinds, have the best; but localities have their favourites, and experience has always prompted me to get a good proportion of free-bearing hardy fruits, even if their quality were not the best. As examples, we have planted dozens of Stirling Castle, King of Pippins, Lord Suffield, and Blenheim Orange Apples; a large number of Louise Bonne of Jersey, Beurre Diel, Marie Louise, and similar proportions of late-keeping Pears; lots of Victoria, Pershore Egg, Kirke's, and other hardy Plums. These are expected to be loaded every year, while many of the best kinds are uncertain. Raspberries require a deep, heavily-manured soil, in a cool position. Pruning still undone may be left till the days are longer.

M. T.



ECONOMICAL KITCHEN-GARDENING.

ANY one having the operation of an extensive market-garden daily under his eye, where vegetables are grown for profit, and may be exported, and who may be familiar with the routine of kitchen-gardening as performed in the gardens of the nobility and gentry, cannot fail to be struck with the contrast between the systems of management pursued in the two instances, not to mention the great advantage the former mode enjoys over the other in quality, and especially in quantity of produce. One is inclined to inquire, sometimes, whether the much vaunted spade-husbandry has so much to recommend it, especially in the raising and maturing of green crops, such as garden-vegetables which occupy the ground the shortest possible time—a few months—swept away and replaced. It does seem certain that, if a soil has been once thoroughly drained and subsoiled, very deep cultivation is unnecessary afterwards, provided that the top 6 inches

is kept tolerably fertilised with farmyard manure. The plough and harrow seem all that is necessary to cultivate the soil sufficiently for the produce of first-rate vegetables of all the annual varieties, such as Peas, Cabbages, Turnips, Beet, Spinach, Onions, Lettuces, &c. And as to the question of expense as compared with garden-culture, field-culture, with its comparatively superior return, is at least performed at one-half the outlay. The conclusion we wish to draw is one which has been advocated before in these pages, if our memory serves us right, and that is, the abandonment of kitchen-gardening in walled-in enclosures, interrupted and mixed up with small fruit growing and fruit-trees, and migrating to some open field of good aspect, and sheltered by plantations or hedges, where the half pleasure-ground character of the kitchen-garden would be abandoned, and only two objects kept in view : first, the raising of the best possible vegetables ; and second, keeping the ground entirely free of weeds, eschewing Box edgings, gravel walks, shears, rollers, and iron rakes, as well as brick walls.

There was once a period in the history of our country, and a long one, when the kitchen-garden was the orchard and flower-garden and pleasure-ground ; indeed, the representative of all that is now meant by the gardens of a country residence. The Abbays and Priories of olden times often had their orchard under their windows, like the farmer of the present day. The residence of the Russian landowner and gentleman, of one storey, thatched and of irregular shape, is surrounded by large kitchen-gardens, his ideas being only now on a level with ours of 200 years ago, so far as horticulture is concerned. Of course we do not speak of the palaces of the Woronzows or Nesselrodes or Gortschakoffs. Nowadays in the country our idea of beautiful gardens does not embrace brick walls or half acres of Cabbages ; but green lawns, and walks of gentle curvature bright and smooth, and shrubberies, and specimens of the trees of many climes — of the empire, in fact ; of China and Japan, and the far west land facing the North Pacific, and maybe from the mountains, the tops of which our soldiers are now espying far away in the horizon, capped with snow, beyond the Khyber. We like to keep our kitchen-gardening out of sight of our drawing-room windows, as we would our turnip-fields, and there really is some other reason why we should do so besides the one of taste.

The kitchen-garden not now engaging its former place as a part of the pleasure-grounds, is in consequence often much neglected, and the labour drawn away to the pleasure-ground proper ; the vegetable crops are, therefore, not so good as they might be, and the kitchen-garden untidy besides, as now arranged with rows of fruit-trees, obstructing

operations, and overhanging crops, Box edgings to be clipped and mended and kept clean, gravel walks to be kept smooth, half the labour is absorbed in unproductive work ; and, moreover, the necessary quantities of manure are deposited on the soil, and subsoils removed under much difficulty and really excessive labour. Another good reason why field-gardening should be substituted for vegetables is, that hardy fruits of all sorts would be much better grown entirely separate from the vegetable crops. The digging among fruit-trees for vegetable crops destroys the fibrous-feeding roots, which ought to be encouraged and top-dressed ; it is a very general practice to utilise the space among and under fruit-trees for vegetables, but it is certain that no vegetables worth the name can be grown under the branches or over the roots of standard fruit-trees.

We have recently inspected several private gardens, where the kitchen-garden was simply a field, the ground laid out in long parallel spaces of about 10 yards wide, with a pathway between, wide enough to admit of a cart passing, made of cinders, but with no attempt at edgings of any sort—the spaces devoted to Sea-kale, Asparagus, Rhubarb, Herbs, Horse-radish, and all perennial things being by themselves, the rest of the ground being cultivated by the plough, and none but the cheapest labour employed—that is, common labourers under the head gardener. The country cottagers' shows vouches for their capacity ; and we are bound to say that a sturdy high quality of vegetables were produced different from the produce grown among trees and drawn up by over shelter.

On this matter of shelter we are inclined to the suspicion that, after all, brick walls are not so good as hedges ; that even walls are not enough without, again, a certain amount of shelter from trees. There is shelter behind a wall if the wind blows perpendicular to it ; but if it blows at an angle, it rushes along the face of the wall and the border fronting it with increased and cutting force, consequently it is frequently found necessary to plant short cross hedges to impede the force of the wind, and woe betide the vegetables which happen to be in a corner when the wind blows—inside and outside a corner there is always an eddy. The hedge has the effect, on the contrary, of both breaking the force of the wind and of filtering it, though thus obviating the parallel rush as experienced in front of a wall. We happen to be acquainted with a kitchen-garden of about 400 yards in length, by about 10 in width, which is peculiarly situated, and at first sight might be pronounced to have the most favourable advantages as to shelter. The position is no other than the bottom of the ditch which surrounds a fort. The ditch may be 30 feet deep, with a high wall on the one side and a

steep bank of earth on the other; there are various angles and straight lines, in the manner of a star. Now down there the vegetables might be expected to grow in perfect tranquillity from all the winds which blow, but it is not so; the place seems haunted with eddies and cutting currents at all times, and the vegetables have a poor time of it, to the great mystification of the gallant commandant who draws on our supposed wisdom. This is, however, the sort of shelter we believe that garden-walls give, but in an aggravated form—indeed no shelter at all, unless complemented by surrounding hedges and plantations: and the question is whether garden-walls in these days might not be entirely dispensed with so far as shelter is concerned; and certainly from an economical point of view, and as objects of taste, they are entirely unnecessary so far as vegetables are concerned; and they are fast losing their *prestige* in the culture of fruits. But let the existing walled garden be devoted to fruit-trees, which of themselves break the force of the wind, and in those days of high-priced labour and refined gardening, let the kitchen be supplied from the field, where the necessary skill to secure good vegetables is only of the field standard.

THE SQUIRE'S GARDENER.



LAPAGERIAS.

ALBA AND ROSEA.

THESE magnificent evergreen climbing plants are indispensable in the greenhouse and conservatory; trained up the walls and rafters, they have a grand effect, and cannot be too highly praised.

The beautiful, waxy, pure-white flowers of the former, and the delicate rose-coloured flowers of the latter, afford a rich and pleasing contrast when grown adjacent to each other, and, backed up with luxuriant dark-green foliage, have a most noble appearance, and are universally admired. Both varieties can be increased, though slowly, by cuttings put in any time from October to December, choosing well-ripened wood that has not flowered for the purpose. Cut the shoots into cuttings with four to five eyes on each—two to be inserted in the soil, and two or three above, with leaves attached, using small, 4-inch pots. Drain them well, and fill them with a compost consisting of equal parts light loam and peat, with a good sprinkling of sand and powdered charcoal. Insert the cuttings firmly all round the edge of the pot; water them with a fine rose, and place them in a cool, moist pit, in a shady position. They can also be propagated by layers, when the plants are at rest; and if the plants to be operated on are planted out, the shoots should be laid in the border in soil prepared for them, the same as for cuttings, making a neat, clean cut up the centre of the growth, and pegging them into the soil the same as Carnations. If pot specimens are to be

increased, use 5- or 6-inch pots to lay the shoots in, and let them stand on the stage round the stool, or on inverted pots, so that they may be in a proper position, and easily got at for watering; for after they begin to make roots, which will not be till well on in the following season, they must be looked over daily. As soon as they are well rooted and commencing to grow the second season, pot them off singly—using pots in proportion to the size of the plants—in the same soil as recommended for striking them in, and always let the young shoots have a small stake or piece of string adjusted for them to twine up. As the plants grow on into size, shift them into larger pots; those of a deep make being preferable, as the roots always incline to go downwards; using the soil in a rougher state, such as turfy loam and peat, with some lumps of sandstone and charcoal, and a few quarter-inch bones intermixed; always minding to drain the pots well, and give them an abundant supply of water at the roots when making their growth. If they are intended for exhibition purposes, they must be trained on a balloon or other trellis, but allowed to run freely when making their growth, and tied down at the end of the season before coming into flower. They also do well planted out, and trained on the back-wall or rafters of the greenhouse and conservatory; but in such cases the border must be made up for them. In doing so dig out the natural soil 3 or 4 feet deep, and as much or more all round as can be found convenient, to afford plenty of space for the roots to run freely; but, as already stated, they incline mostly to strike downwards—hence the border should be of a good depth. To insure perfect drainage, a layer of broken bricks should be laid in the bottom, over which place another layer of broken pots, &c., and then some of the roughest of the soil, which should be prepared by mixing equal parts turfy loam and peat, a good addition of charcoal and quarter-inch bones, and some lumps of white sandstone; and if the loam is very heavy, a small portion of bruised sandstone should be added. Having the border made up with this compost, and the plant to be put in well established in an 8- or 9-inch pot, it will be safer to wait until growth is fairly commenced before planting out; and in doing so, carefully relieve any of the roots that may have been twining round the sides of the pot, and clear away all the crocks from the bottom of the ball, planting deep enough to cover the whole of the ball, and then cover the surface with fine gravel. After planting give a good soaking of tepid water to settle the soil about the roots, and regulate and tie out the shoots to the wires with small slips of matting, taking care not to break their points. The plants must also have attention during summer, so as to keep every shoot in position, as they are apt to get twisted together when growing, and are not easily separated without damaging the foliage. A slight touch with the syringe on fine afternoons will also prove of great advantage in keeping the foliage free from dust, vermin, &c.; and a weak solution of soft soap

and water applied with the syringe over the foliage once a-week will also help to ward off green-fly, &c., which are sometimes troublesome when the growths are young and in a succulent state, and when it would be dangerous to apply the fumigator, as we have invariably found that the tobacco-smoke kills the young shoots, making them quite black and shrivelled before the fly seems to suffer. All plants, either in pots or planted out, must have an abundant supply of water at their roots during the growing season, not given in dribblets, but a thorough soaking at a time; and weak liquid-manure occasionally will be found very beneficial up to the time the plants have finished flowering. They are also the better of a little shade in hot, sunny weather, until they stop growing, when they should be fully exposed to light and air, so as to thoroughly ripen the wood, on which depends a great deal the quantity and quality of the flowers. After the plants are done flowering they should be kept very cool, and have less water at the roots, but be by no means allowed to become too dry, as they will in that case suffer.

DUNDONIAN.

[Along with this we received a bunch of blooms, which are wonderful for size and substance.—Ed.]



DECORATIVE GREENHOUSE-PLANTS.

THE AZALEA.

THE rage or fashion for fine-foliage plants, chiefly denizens of the plant-stove, which has existed for a number of years, has been the means of causing a great many of our finest greenhouse-plants, and particularly the hard-wooded section of them, to be elbowed almost out of cultivation. This state of matters may have arisen partly from the fact that what are generally termed "foliage-plants," whether of stove or greenhouse, are much easier of cultivation than the section of hard-wooded flowering-plants, and partly from the fact that the culture of foliage-plants has received an almost undue amount of prominence and encouragement from our horticultural societies, to the all but total exclusion of the greater proportion of greenhouse-plants proper. Excepting such things as Azaleas and Heaths, it is very rarely that we see a well-grown specimen greenhouse-plant on our exhibition tables; while stove-plants, such as Crotons, Dracenas, Palms, &c., are shown in numbers and varieties almost bewildering, a great many of the new varieties, indeed, being very slightly, if at all, different from many of the older varieties. And the cry is, "Still they come!" Undoubtedly such plants are better adapted for house and table decoration than the general run of greenhouse-plants, and are available for this purpose at all seasons, whereas the others are not; and while the fashion for such decorations continue, foliage-

plants will be largely grown for the purpose. Though I am particularly fond of the stove and its occupants, and would not like to part with them, still I think it a pity that greenhouse-plants should also not receive a larger share of attention than usually falls to their lot in the majority of places. If some of our leading horticultural societies would inaugurate the giving of prizes for this class of plants, no doubt plenty of cultivators would be ready to take them in hand.

In the following remarks, which are meant chiefly for young gardeners, it is intended to give just a few hints on the propagation and cultivation of some of the principal and most useful varieties of decorative greenhouse-plants. And first we may take the *Azalea*, as being one of the most useful as well as most highly decorative plants of the section. The *Azalea* is imported in such quantities from the Continent, grafted either as dwarfs or as standards, and is sold at such a very reasonable price by our nurserymen, that, unless by way of practice, it hardly pays to propagate them in private establishments. Should any wish to try their hand at it, however, one of the strong-growing common varieties, such as Fielder's White, should be selected from which to raise cuttings, as stocks on which to work the finer varieties. The cuttings may be rooted in a mixture of peat and sharp silver sand—1 part of the former to 2 parts of the latter; and they may either be pricked into a propagating-box where a brisk bottom-heat is maintained, or they may be put in a pot covered with a bell-glass, and plunged in a hotbed. As soon as they are rooted pot them up singly in small pots, still using peat and silver sand, and replunge them in the bed for a time, till they take with the potting, after which they may be transferred to a warm house, and encouraged to make good healthy growths, and be well ripened, after which they may be kept cooler during the winter. Before grafting, the stocks had better be put into heat for a short time, so as to excite the sap into active circulation; and when ready, head them over at the height you wish to graft; split the stock down half an inch or so with a sharp knife, and insert the scion, wedge-like, tie them well together, and cover with grafting-wax, and replace them into the propagating-box or hotbed; keep them close and warm until the union be complete, after which they must be gradually inured to the light and air. Pinch the points out of the young shoots occasionally, so as to induce them to form good heads.

When ready for shifting into larger pots, the proportion of good fibry peat should be increased, and a few small pieces of charcoal may be added with advantage. Ram the soil hard about them at all future pottings; and for small plants the soil may be rubbed down

pretty fine ; but for larger plants—say from those in 8-inch pots and upwards—the soil should be rather lumpy, being merely broken to pieces with the hands ; and if good fibry loam is to be had, a little may be added, though it is not necessary. When they have done flowering they should be placed in a house with a temperature of about 60° at night, till they make their growth, giving them a dewing night and morning with the syringe. When growth is made they should be gradually hardened off ; and about the end of July they may be set out of doors, standing on a bed of ashes to keep out the worms. Stand them in a sheltered place, but exposed to the sun, so as to get the wood thoroughly ripened and buds formed. They may be again taken under cover early in October, placing them in a cool house. If they are wanted to bloom early, a few of those having the most prominent buds may be placed in a gentle heat, and gradually pushed forward—not too hard, however, at first. Other batches of them may be introduced in the same way at intervals, in order to keep up a succession of bloom ; while those intended for late flowering should be kept as cool as possible—a few degrees of frost even will not do them any injury. With judicious management as to forcing and retarding, a supply of bloom may be had the greater part of the year.

The great pest of Azaleas is thrips. This must be diligently looked after, and fumigated on the first symptoms of it appearing, repeating the operation two or three times, else they soon spoil the appearance of the plant, besides doing a great deal of injury. I habitually give them a syringing every few weeks during the growing season and while they are at rest, with soft-soap dissolved in warm water—a piece of soap about the size of a hen's egg to a large watering-potful of water. We lay the plants on their side, and dash it well into them ; and then in a few hours we syringe them in the same way with clear water. Besides keeping them clear of thrips, this also keeps the foliage clean and healthy. There are so many varieties of Azaleas in cultivation, and so many of them are good, that it is difficult to give a list of what all would consider the best. I may just enumerate a few of them, however, that are really good and will generally give satisfaction, merely giving the names, as colours can be found by consulting any catalogue.

Baronne de Vriere, Beauté Supreme, Dr David Moore, Duc d'Arenberg, Duc de Nassau, Duke of Devonshire, John Gould Veitch, Le Flambeau, Queen of the Whites, Queen Victoria, Roi des Belges, Roi des Blanches, Stella, Souvenir du Prince Albert, William Bull, Princess Mary of Cambridge, Todmanii, Alice, Flag of Truce, and Model.

J. G. W.

ORNAMENTAL TREES AND SHRUBS.

TILIA (THE LIME-TREE.)

THE genus *Tilia* is composed of a limited number of umbrageous, deciduous trees, of stately growth, indigenous to the temperate and colder regions of Europe and North America. They are all very hardy, and of free growth in most districts of Britain; and though seldom if ever planted merely for their timber, they have long been extensively introduced into our parks and other ornamental plantations, where, whether standing singly, grouped, or associated with other trees, they impart a richness and beauty to the landscape peculiarly their own. They are, moreover, invaluable for town gardens and street avenues, where, notwithstanding the dust and smoke, they succeed better than most other large-growing trees.

The wood of the Lime-trees, though lacking the strength and durability necessary for general purposes, is nevertheless utilised in the countries where it abounds for fancy-work, such as cabinet-making and carving, as it stands well when not exposed to the weather, is easily wrought, and is susceptible of a fine polish. The inner bark of all the species is strong and much used in the manufacture of mats, baskets, and other useful articles.

T. Europæa (*the common Lime or Linden-tree*).—This, the best known of the species, is found naturally in several of the countries of the Continent, and if not also indigenous to Britain, has been so long in cultivation that it would be difficult to assign a date for its introduction. It is a broad, thickly-branched tree of from 80 to 100 feet in height. The leaves, with which the branches are amply clothed, are of a cordate form, sharp-pointed, serrated, smooth, and of a pleasing light-green colour, assuming as they decay a yellowish-brown tint, a feature very much admired in autumn.

The flowers, which expand in July and August, are produced in cymes or umbels; they are individually small, light-yellow, and form no very important feature of the plant. So far as regards appearance, they are, however, deliciously fragrant, specially "at dewy eve, distilling odours;" and as they abound in honey they supply admirable pasturage for bees. The wood of this tree is soft, light, but close-grained, not liable to be attacked by insects, nor, when properly seasoned, to warp. It is much used by turners and carvers, and by manufacturers of toys. Its charcoal is of the finest quality for making gunpowder. From the inner bark is obtained the material for making bast-mats, of so much value to gardeners for packing, covering, and tying up plants, and which are annually imported in great numbers from St Petersburg, Archangel, and Riga. The trees

from which this is obtained are from 10 to 20 years old, cut down and stripped in summer when full of sap.

Of this grand and very familiar ornamental tree, it is unnecessary to say more by way of recommendation than that it should never be omitted in the laying out of parks and other pleasure-grounds in the neighbourhood of country mansions. It grows freely in almost every variety of soil, preferring, however, such as are rich and deep; and though very hardy, and capable of enduring any amount of frost it is likely to be subjected to in this country, the finest specimens are always found where they are in situations sheltered from the full force of the blast.

From a number of distinct and handsome species, we select the following as most worthy of notice:—

Var. *platyphylla*, sometimes called *grandifolia*, is a distinct and very desirable variety, with larger leaves than the species; they are slightly downy on the under surface.

Var. *lacinata*.—This form has its leaves curiously cut and twisted; it is of slow growth, and is usually grown as a standard grafted on the species. It makes a neat lawn tree.

Var. *sanguinea*.—Well known as the Red-twigged lime. The young branches have a fine effect in winter when destitute of leaves.

Var. *pendula*.—A form differing from the species in its drooping habit; grafted on a stem of the common sort it forms a fine weeping specimen well adapted for prominent sites on the lawn or large shrubbery border.

T. Alba (*the white-leaved or Hungarian Lime*).—Some writers have doubted the propriety of ranking this tree as a distinct species regarding it as a variety only of *Europæa*. It is, however, so distinct and constant, that we think it best to adhere to the original and still most popular arrangement. It is indigenous to Hungary, where it is said to occur somewhat sparingly, and from whence it was introduced to this country in 1767. It forms a broad, bushy tree of from 30 to 50 feet in height, the branches well furnished with cordate leaves, unequal at the base, sharply serrated, smooth green above, and downy beneath, dying off light-brown. The flowers, which appear in July, are yellowish-white, small, and very fragrant. In its native country the timber and bark of this species are used for similar purposes to that of the common Lime. It is here much esteemed by planters of decorative trees not only for its hardiness, its free growth, and symmetrical outline, but for the beauty of its leaves, which, when stirred by the breeze, reveal their silvery under surfaces, producing the happiest effect.

Var. *pendula*.—This sort differs only from the species in its drooping branches; grafted on 6-feet stems of the Common Lime, it makes an admirable specimen for a lawn.

T. Americana (*the American Lime*).—This species has a wide distribution in Canada and the United States, where it attains heights of from 70 to 80 feet. It was first sent to this country in 1752. The leaves are cordate, sharply serrated, larger than the European species, and of a smooth, shiny, bright-green colour, changing as they decay to a light brown. The flowers are similar in form and colour to those of the other sorts, appearing in July, and very fragrant. Though similar in general appearance to the Common Lime, it is easily distinguished by its bark, which, instead of being either green or red, is dark-brown. It is a very hardy, handsome tree, of a symmetrical habit of growth, and well worthy of a place as a single specimen in a park. It should be planted in deep rich soil, and in a moderately sheltered situation.

HUGH FRASER.



NOTES FROM THE PAPERS.

THE Rev. George Henslow has succeeded in convincing the scientific mind by an elaborate series of experiments that plants do absorb moisture by their leaves; and it is now acknowledged that the belief entertained by gardeners for long enough that they could feed their plants, to some extent, through their leaves, is based upon sound principles. It is perhaps not worth while inquiring how gardeners became possessed of the notion that leaves absorb moisture—a question which “has been a subject of controversy” among botanists for 150 years; but we think there is little doubt that, like Boussingault, they have some time or other been “fortunate in proving that plants in nature, wilted by intense heat and drought, recovered on exposure to dew and rain, but without the water reaching the roots,” and hence concluded that they might copy nature in their garden practice. It must be amusing to a gardener to read—in the face of the fact so familiar to him, that detached leaves or bits of leaves revive, after being allowed to droop, when moistened with water—that “a long series of cut leaves and shoots were gathered at 4 P.M. one day last September,” by Mr Henslow, “then exposed to sun and wind for three hours, then carefully weighed and exposed all night to dew. At 7.30 A.M., after having been dried, they were weighed again, and all had gained weight, and quite recovered their freshness, proving that slightly wetted detached portions do absorb dew.”

Twenty years ago we knew a noted *Pelargonium* grower who was in the habit of regularly syringing his plants overhead with weak soot and guano-water, in the conviction that they “took it in,” as he expressed it. “But, James,” said a neighbour to him one day, “you know scientific authorities say that plants do not absorb moisture by their leaves.” “I ken that fine,” said Jamie, “but I dinna beleev’t.” It will gratify gardeners of James’s persuasion now to know that after one hundred and fifty years’ controversy and experiment, scientific authorities have pronounced in their favour.

According to the 'Gardener's Monthly' (America), the *Rhododendron occidentale* is one of the grandest flowers ever seen. It is a native of California (and consequently hardy in this country), where it grows along the streams of crystal water in thickly wooded districts throughout the state. The finest examples are found in the Sierra Nevada around the silver creeks, where they are covered with snow for four months in the year. *Rhododendron occidentale* is a shrub growing 3 to 6 feet high, with large and handsome shining green foliage that makes a most charming setting for the large and conspicuous flowers, which are from 2½ to 3 inches long. The corolla is usually snow-white, with the upper lobe yellow inside, but varieties are sometimes found with rosy-tinted flowers. The flowers are borne in large clusters of from 10 to 20 each, and the writer in your American contemporary thinks it will be found the best flower which California has yet supplied, as well as one of the hardiest, as it grows where the snow lies on the ground four or five months in the year, and yet where the sun in summer will send the thermometer over 130°.

One would hardly expect to find the largest and most prolific Pear-tree in Great Britain in the Highlands of Scotland, but, according to the 'Journal of Forestry,' it is so. A correspondent writing from Forres says there is to be seen in the prosperous little village of Garmouth a Pear-tree of enormous size, belonging to Mr James Spence, merchant there. It is known to be over a hundred years old, and is of the following dimensions: height, about 40 feet; circumference of trunk, 5 feet; diameter of space underneath the branches no less than 14 yards, which gives the enormous circumference of 126 feet. The huge branches are supported by means of planks running along the top of eleven immense wooden pillars. The Pears are not large, but are very sweet, and are known by the name of Golden Knot, or Golden Ball. I counted a single cluster, which numbered no less than 300. The happy owner of this, perhaps the largest and most prolific tree of its kind in Great Britain, informed me that three years ago he had the curiosity to count the Pears it yielded. When gathered they then reached the enormous number of 28,600. At that time a large portion of the tree did not yield fruit, and since then very little has grown on it. None of the Pears are as yet taken off this season; they hang in clusters like Grapes: a prettier sight one could not imagine, and it is confidently expected that this season they will number considerably over 50,000! No doubt this is the variety described by Hogg as the Golden Knap, and as being "a prodigious and constant bearer, but otherwise of no great merit." It is said also to be grown extensively in the Carse of Gowrie.

According to a contemporary, Mr Macagno, in a paper "devoted to the consideration of the physiological functions of the leaves of the Vine," declares, as the result of his experiments, that the principle juices of the Grape berry—viz., grape-sugar and cream-of-tartar—are first elaborated in the tissues of the leaves, and appear at a later period in the berries. These two elements, we are informed, are found in greatest proportion in the young leaves, above the bunches, and in less proportion in the leaves which do not bear bunches, and in the leaves below the bunches. Hence Mr Macagno assumes, though it is not very clear why, that the removal of the leaves above the bunches must interfere with the proper nutrition of the latter. This, it need hardly be mentioned, has also long been the common opinion of gardeners, and has been generally acted upon in practice; but it has of late years been proved conclusively enough that the removal of the leaves beyond the bunch does not interfere with the proper nutrition of the fruit, so long as healthy foliage is on the Vine

and in the neighbourhood of the bunch. Mr Macagno's experiments simply proved the correctness of the views entertained by all Grape-cultivators, that a healthy development of the foliage of the Vine is absolutely essential to the production of fruit of good quality.

A curious fact, says one of the London dailies ('Globe'), is recorded in connection with some experiments lately made, by direction of the Paris Acclimatisation Society, with some grains of wheat received from Japan. Very little spring sowing of wheat takes place in France, and as the small land-owners who till their own land single-handed are frequently occupied in various avocations during the day, they have very little opportunity for paying proper attention to their farms at seed-time. The uncertain weather, again, prevailing in October and November, is a great drawback to all agricultural operations, and especially to such as are conducted in this desultory manner, often, indeed, forcing the agriculturist to sow the inferior "spring" or "summer" wheat when he has been unable to prepare his ground for the more desirable "winter" variety. A suggestion, however, from a correspondent in Japan has resulted in the discovery that Japanese wheat, planted in April or May, is ripe and ready for the harvest quite as early as European-grown wheat sown some five or six months earlier, and that the yield is equally large with that produced from any of the varieties of European wheat. The great advantage derived from the cultivation of the corn in question is in the additional time available for ploughing and preparing the land, instead of these operations being performed hastily under the uncomfortable and disadvantageous circumstances of wet, uncertain weather. These benefits would be thoroughly appreciated in such a climate as our own. In cases where labour is abundant, the additional period thus available before seed-time could be probably turned to account in the cultivation of other crops in the interval; or, if this is not done, the land would benefit by lying fallow for three or four months longer than would otherwise be the case. Unfortunately, no particulars are given to enable any opinion to be formed as to whether the "Japanese wheat" is a new variety of corn, or whether its characteristics have been developed in European wheat by any peculiarity in the soil, climate, and position of the locality whence the particular specimen referred to was derived. We give the facts, however, as they are reported by the Paris Société d'Acclimation, in the hope that any benefits that may be derived from the alleged discovery may be fully realised in this country.

At one of the late Chrysanthemum Shows in England, a misguided young man, but "a young man of great promise," nevertheless, with a more accurate conception of the capacity of the judges than of the vigilance of his opponents, constituted flowers up to the standard degree of excellence by parting and pinning two or three inferior flowers together. The judges awarded him the first prize (!), but another exhibitor, more suspicious than his neighbours, made a critical examination of his opponent's flowers and discovered the fraud, at which stage of the proceedings that "young man of great promise" disappeared from the scene, feeling no doubt that he had not the fortitude to receive the shower of compliments that awaited him as a "dresser of florets of flowers," but we should say his services will nevertheless soon be secured elsewhere. The "manufactured" blooms were removed to the Secretary's chamber, and there, amidst a crowd of righteous exhibitors and bystanders, with the hair of their head standing erect, no doubt, like that of Sandy M'Grattis when he saw the ghost, the awful nature of the offence was revealed. One of your contemporaries has, it appears, received more letters on the sub-

ject than it can find room for—all invoking vengeance on the head of the culprit, we apprehend ; but the same paper, while repudiating the conduct of the delinquent in strong terms, hints that after all is said and done, making up “Chrysanthemum blooms” in the way described and “dressing” Carnations and Picotees, as is the custom among exhibitors, are practices which may not differ greatly under certain circumstances. We are of opinion that the party who discovered the fraud did a real service in exposing the same to the Secretary, but having done that, and drawn attention to it in the press once, his duty ended there. To the delinquent we say, as ‘Punch’ said, “Good boy, don’t do it again.”

READER.



MIGNONNETTE FOR WINTER FORCING.

As the cultivation of Mignonnette for winter forcing is a work that demands prospective attention, I have chosen the subject as one likely to be both agreeable and interesting to many readers of ‘The Gardener’ at the commencement of the new year.

Who is it that does not admire a Rose-bud in December ? or that does not wish for the return of their favourite garden companions ? Amongst which the object of the present paper takes a leading place—forcing Mignonnette. The term is significant, as if the winter culture of this esteemed annual should be exclusively the business of the professional gardener ; this, however, need not necessarily be so, wherever there is a single vinery or greenhouse where a mean temperature of 50° can be maintained.

There are several varieties of Mignonnette, some of which are worthless for forcing, but there are also many excellent strains that can be procured from any respectable seedsman who has an eye to the popularity and enhanced value of genuine novelties in florists’ seeds. The writer has found nothing better than that sold under the name of Parson’s Tree Mignonnette ; and Miles’s Hybrid Spiral is also giving great satisfaction. The latter is better adapted for growing in small pots ; the habit is dwarf, and the flower-stalk is of more than ordinary length. Approved strains of the former are well fitted for covering trellises as taste may desire.

Speaking, or rather writing, of training, I do not think it is a writer’s duty to dogmatise on any particular form of training, as gardening is either a pleasure or it is nothing, therefore every one should have a right to please their own fancy, although I would like to see nature have more of her own way at times. Umbrella-shaped standards find favour with exhibitors ; and the pyramid form is also popular. I adopt it with a few plants, but prefer the natural or bush form which, when neatly done, presents no mean appearance amongst a general collection of plants, and, unlike those formal heads or cones that look as if they had been clipped with shears, are suitable for a

variety of purposes ; and yet the latter are pleasing objects in their own places, when training is not “overdone”—that is to say, when the plants are tied for the last time a little while before growth has ceased, and there is a regular surface of growth all over the trellis, something like a bed of Mignonnette in the open air.

The seed should be sown some time during the month of February, or not later than the beginning of March, in 3-inch pots, washed clean, and drained with a single crock laid over the drainage hole, and a layer of cakey leaf-mould placed over it. The root should then be filled to within watering space of the brim with rich open mould, and pressed firm with the fingers. The requisite number of pots being collected together on the potting-bench, and filled as directed, shake a little soil through a fine sieve all over them in order to make a fine level surface on which to lay the seeds, to the number of three or four in a pot, and then cover slightly through a sieve as before.

If all the seeds germinate, of course the number will be reduced to the strongest and most promising plant nearest to the centre of the pot. When the seed is covered, the next point to be considered is the most likely place to set the pots during the process of germination. It may be said it is not a difficult matter to raise any quantity of Mignonnette from seed ; still it depends much upon how the young tenderlings are treated at this stage, whether they will develop and furnish shoots in sufficient number and strength to form a trained specimen. Therefore it is recommended that some special provision be made at the commencement to keep the plants in a uniform temperature till they are finally hardened off and turned out of doors. A check to growth is sure to succeed if germination takes place in a warm frame ; for although the atmosphere of a propagating frame may be favourable to germination, it seldom or never happens that such conditions can be kept up afterwards, and a check is the result. A mean of 60° is safe, and if the soil is in a moist state when used, and not exposed to variations of temperature, the seeds will germinate in it without any further trouble than that of keeping up a humid atmosphere by frequent sprinklings through a fine syringe. When the young plants have attained the length of 2 or 3 inches, an upright stake will be necessary to tie the plant to ; and the conditions recommended during germination will need to be gradually modified until the plants are fully exposed to light and air. There is no better place for growing these and similar plants successfully than a low pit, with a single hot-water pipe round it, where a steady temperature can be kept up during our changeable spring months ; and it is also advised that the pots should be plunged in sifted coal-ashes to lessen the necessity of watering, and to counteract the effect of the outer air as long as the plants are confined to small pots : and if the pit is a lean-to, they should be turned round occasionally so that they will be fairly proportioned and balanced for whatever form they are ultimately

intended to take. Watering will be best performed through a fine rose; and they will also be benefited by a sprinkling of water overhead when the pit is being shut in for the night, on the afternoons of fine days, after air has been freely admitted through the early part of the day.

The compost most suitable for growing *Mignonnette* is turfy loam, rotten manure, and a small proportion of soot—the two latter forming about a third of the composition, supposing the manure is in a proper working condition; if this is not the case, a third of rough leaf-mould and horse-droppings can be substituted, and will answer the purpose very well with a dash of soot added: a fertiliser of no small value in the cultivation of large or small specimens.

I may now observe that in potting, and in all future details, the cultivator, whether his requirements are great or small, must, in the first place, determine what form or forms of training will answer his purpose best; and in potting the first time, the plants should be arranged in order to prevent confusion afterwards. Those that are intended to form umbrella-shaped standards should be encouraged on one clean stem to the required height, and pinched by merely “breaking off the point of the shoot” in the soft young wood, so as to get a number of free breaks which, in process of time, will multiply themselves, and cover the whole trellis. The neatest and best furnished at the joints which promise to grow with vigour should be selected for growing into pyramids, and those of a more dwarf habit will come in for growing into bush specimens.

Having supposed the plants to be healthy at the root, and to have been shifted at the proper time,—that is, when the soil in the seed-pot was like a block of mushroom spawn—when broken a mass of white fibrous roots,—it is a fact that many young plants get more food than is good for them at this stage, the roots naturally run to the side of the pot first, when there is hardly a single root in the centre of the ball, then comes overwatering and consequent bad health; instead, therefore, of giving certain dates for shifting, I would say be guided by personal inspection, and act accordingly. After the plants are shifted into 5- or 6-inch pots, as the case may be, they should be returned to their old quarters, and shaded from strong sun for an hour or two in the middle of the day, and only syringed overhead in the meantime till they begin to root afresh. The great object from this date is to keep them in a continually growing state by supplying them carefully at the root with water and syringing them constantly overhead whenever the weather is favourable,—this keeps the young growths soft and increases the number of shoots rapidly. In changing the position of the plants, as the days lengthen, to one of natural shade, it should be done when the weather is likely to be settled for a few days so that the change will not result in a check to growth; and, of course, they will still have the protection of glass in cold weather. If there be any secret in the cultivation of these plants, it is in not pushing growth too fast at the com-

mencement, but to keep them moving steadily till genial weather is ready to assist you, and then drive them along as fast as they will go. When the weather is mild enough in June to leave them unprotected, their position through the summer, whether it is favourable or otherwise, is of far greater moment than the actual attention required in watering, pinching, and training. The pots should be set either on wooden spars or on a bed of coal-ashes or other rubble, behind a north wall, where they will have the benefit of light, but no actual sunshine unless what is subdued by decreasing power in the afternoon. In a week or two after they are fully exposed they may have their final shift into 9- or 10-inch pots, and training should be commenced immediately afterwards. Most people have wire-trellises made by the skilled hands of the wire-workers, and only need fastening to the pot. The umbrella standards, at all events, are best procured ready made, and when fixed in the pot the leading shoots should be drawn with a view to filling the trellis equally at the end of the season: one tie to each shoot will be sufficient at the beginning, and all through the season the shoots may be allowed plenty of growing room, merely keeping the main growths within bounds. The pyramids are easily formed, the principal thing required being a little judgment in anticipating what size of trellis a plant would cover from its appearance at the end of June. The pyramid is formed in a rude way by placing a stout upright stake, painted green, to the plant, and by putting a wire-hoop round the rim of the pot, extended or otherwise, as the case may require, then adjust fine wires from the summit of the stake to the wire-hoop with the matter of three or four circles interwoven in the vertical wires to make the trellis convenient and substantial; the shoots are then regulated all over the trellis at equal distances, and every subsequent shoot formed is laid in to fill the spaces between.

It would be almost superfluous to refer to artificial bush-training, the system is so well known: one advantage, however, in the management of large bush specimens, is to run fine wires from stake to stake at about an inch from the top of each, so as to form a sort of hidden framework to train upon. I saw one of those lovely bush specimens 7 feet 4 inches in diameter last year, which was timed to a nicety in tying, and the effect was all that could be desired. But to return to the details of summer treatment, after the last potting the plants will now grow apace, and must be regularly watered and syringed overhead, twice a-day in bright weather, for reasons before suggested. All flowers should be removed as they appear, and training proceeded with in a rough way till the approach of autumn, when system and regularity should be the order of the day; but at no time do we advise or recommend training of a style that savours of trimming at a barber's shop. As the days grow short and the nights grow cold at the end of September, the plants will require the protection of glass, and to be gradually introduced in small numbers to a tempera-

ture of 55°, where they will flower in great profusion, and maintain the character of summer-grown plants, which a high temperature or a sudden change would totally destroy.

Our early batch is now a-glow : some are being cut, and others are utilised for various decorative purposes.

W. HINDS.



THE AMATEUR'S GARDEN.

BELIEVING that a few of the simplest directions in regard to the cultivation of small gardens will prove of use to a large and increasing number of your readers, knowing that very many of them inhabiting suburban or country villas with small gardens attached to them (but who do not employ professional gardeners) are often at a loss how to proceed, and in consequence do not get the amount of pleasure out of them that they might,—I beg to offer a course of papers for their assistance. I will not say anything on the laying out of grounds, as the proper disposal of ground into kitchen quarters, shrubbery, flower-beds, and the levelling of ground, making of walks, &c., require to be done by persons accustomed to such work if it is to be done properly ; and, moreover, rules might prove of no use in a majority of instances. Therefore I consider the space will be better occupied with cultural directions, such as the preparation of the ground, the selection of seeds, the season for sowing, the manner of sowing, and all the routine of generally cultivated kitchen-garden crops for one twelve-month. The intention is to aim at this in the simplest possible manner consistent with complete directions how to cultivate everything, so as to secure the greatest possible success. It may perhaps not be practicable to time the papers so that each as it appears in 'The Gardener' will be that suitable for any given month. It is also my intention to give as a sequel a few chapters on the most popular flowers of the day suitable for small gardens, as well as directions for the successful management of the greenhouse, garden-frame, &c. It will, then, be seen that the programme is pretty extensive, and when completed it is hoped that it will be one to which amateurs may refer in after years. At the same time, it is hoped that even professionals may peruse these papers with profit, and more especially young men who may be entering places for the first time ; as it often happens that hints to those whose attention, in the probationary stage of their career, has been too closely directed to plant and fruit growing under glass, or to the more strictly ornamental departments, may prove of value, as not a few find kitchen-gardening the weak point in their professional knowledge.

Our selection of seeds will be very short, as nothing tends more to perplex the inexperienced than overwhelming lists.

As the first paper appears in January, I shall begin with work suitable for this month, and shall endeavour to do the same for the first few months of the year at least.

THE CULTIVATION OF THE SOIL.

In new gardens the soil is very often of a poor description, and in order to grow the finest vegetables to the greatest perfection, it is imperative that means be taken to put it into good condition. It is scarcely necessary to say that, in the first place, it *must* be well drained. Stagnant water will render abortive all efforts to cultivate well. If it is heavy clay it will be greatly improved by an addition of fine lime-rubbish, sand, fine ashes, or road-sweepings, especially off a road where the soil is of a light nature. But nothing will prove so useful as wood-ashes, or part of the soil itself burnt. Light soil requires the opposite treatment. Medium soils need nothing to alter their mechanical nature. But all will require trenching and a very liberal manuring to get them into the best condition the first season. All garden soils are better if they are at least 2 feet deep, but many are not 1 foot. To prepare any of these properly, let them be carefully turned over, trenched, and a good layer of stable-yard manure dug in between every spadeful of earth. If the soil is only 1 foot deep, it will be advisable to turn a little of the subsoil to the top, if of a good quality, with a view to a deepening of the whole. Over this subsoil should be spread a layer of very rotten manure to be worked in in spring, mixing the manure, subsoil, and good soil as well as possible after they have been pulverised with the weather. For this purpose it is best to prepare such soils in autumn, as they then are exposed to the whole winter's frost, and the rains have the effect of carrying the essence of the manure into the body of the soil in an equal manner. If during frosty weather a good soaking of urine can be given, it will further prepare the soil for carrying first-class crops the first year. If the subsoil contains iron, as is the case in most sands and gravels, or if otherwise unsuitable, it will be much better to simply break it up with the fork, or pick if necessary, and leave it where it is, laying a good coating of manure over it; and by the next time it is turned over the rain will have washed the deleterious matter out of it, and that part of it enriched by the layer of manure will be fit to turn to the top, when another inch or two can be broken up and improved in the same way. This has been my own practice on a soil which did not average 8 inches, and I can recommend it as being the best way of improving thin soils when fresh good soil cannot be added. Of course this only applies to thin soils. But even when the soil is deep, the bottom of the trench ought to be left in a broken state, more especially if it be at all heavy.

It is to be understood that the foregoing remarks apply to soil under cultivation for the first time. In ordinary garden soils less work and much less manuring will suffice. But when land is first broken up, it will always pay to treat it in the liberal manner described. Trenching is not resorted to as often as it should be in villa gardens. It is too much the custom to simply spread manure over the surface of the ground annually, and dig it in in spring; and no difference is made, no matter how great may be the different requirements of the plants cultivated. Where the soil will admit of it, it ought to be turned over to the depth of 2½ feet once every three years. The first year it

ought to get a liberal manuring, according to its condition, and will then be fit to grow the finest crop of Cauliflowers, Cabbages, Brussels Sprouts, Savoy, Greens, Peas, Beans, &c. Next year it should be turned over two spades deep, remembering that most vegetables are gross feeders; a good manuring ought to be again given, and different crops put in the same ground. Potatoes, with a light manuring applied during autumn; Leeks, but heavily manured, and a host of other things, such as Turnips, Lettuces, and Salads generally, will come in the second year, and will do well on ground so prepared. The third year manure of ordinary description may be dispensed with, and tap-rooting vegetables will grow to the greatest perfection, such as Carrots and Parsnips. Many recommend trenching the soil for these crops; but when broken up triennially as described, and when manure is withheld, except a drenching of urine during frosty weather, I have always found cleaner and finer crops than when otherwise treated. They grow cleaner because there is nothing in the way of fresh manure to entice the roots into the formation of forks, and as the real plant-food sinks downwards by the action of rain, there is a tendency in the tap-roots of Carrots and Parsnips to follow it. Soil for Onions is best prepared by trenching in autumn, keeping all the manure within a very few inches of the top, where the roots can readily lay hold of it. One dose of urine while the ground is frozen will prove of the greatest benefit to the crop, and so will a sprinkling of wood-ashes. Indeed these two valuable matters may be applied everywhere with great benefit if not overdone.

For Rhubarb, soil should be trenched deeply and heavily manured—nothing will prove of greater benefit to this crop than night-soil well mixed with the soil. But it ought to be applied some time before planting, so that its ammonia may have time to permeate the whole body of the soil—otherwise roots coming into contact with it are apt to be injured. The same remarks apply to Seakale. Where Asparagus is grown it requires a deep, free, well-drained soil, well enriched with stable-yard manure and prepared by several turnings. But unless the climate is all the better, I would scarcely advise the amateur to attempt Asparagus culture, as it requires much labour and cost before it can be planted at all; then it is two or three years before it yields, and if the soil is heavy, or the situation exposed, ten chances to one but it is dead or the bed full of blanks by that time. Still some of your readers may wish to try it, and to them is offered the above remarks on the preparation of the soil, and its further cultivation will be treated of by-and-by. For all ordinary bush-fruits, such as Currants, Gooseberries, Raspberries, &c., as well as Strawberries, soil prepared or recommended for Cabbages, &c., will answer; but it is best to plant these in autumn—the Strawberries in August, September, and early in October; the others in October and early in November. But the cultivation of these will be more fully noticed in due course.

The subjects here mentioned include the greater part of commonly cultivated kitchen-garden plants. Where special preparation of the soil is necessary for special subjects, it will be noticed when these come to be considered.

PLANTS FOR JANUARY.

Peas.—A small sowing of Peas may be made some time during this month in favourable localities, should the weather be open and the soil in good condition, otherwise there is no gain in being early; and those with small gardens had better wait until the soil is in good condition. The best kinds for sowing thus early are *First Crop* or *Ringleader*, *Kentish Invicta* (rather more tender than the first, and apt to rot on wet soil if sown too early—otherwise an excellent Pea),

and *William First*. One pound will sow 20 feet of a drill 4 inches broad. Sow not closer than 5 feet between drills.

Beans.—Sow a few *Early Mazagan*, 2 feet between drills, 3 inches in the drill. This is the hardiest Bean we have.

Cabbages.—Strong plants may be put out in sheltered situations where the climate is mild ; but it is quite soon enough yet for most localities.

Mustard and Cress may be sown under a frame or in a box placed in a greenhouse or in the window, and will soon be fit for use.

A GARDENER.



TUBEROSES FOR WINTER FLOWERING.

To say that the Tuberose is everybody's flower in winter would be exceeding the mark, although its cultivation is simple and the price of the bulbs exceedingly low. It is therefore surprising that they are not more generally cultivated where the Rose, the Gardenia, and the Eucharis find a home, and are cherished by the lovers of the chaste and beautiful amongst winter flowers. They are of the purest white—a colour which is in great demand in winter—and are sweet-smelling as well. Their presence in bridal or other bouquets, or as button-hole bouquets for gentlemen, renders them an acquisition, and is certain to enhance the estimate of their associates in whatever form they are employed. A year ago I invested a small sum in the purchase of these bulbs, and they have done good service for some time past in furnishing little dainty flowers for special occasions. The time of potting should be regulated according to the time they are wanted in flower ; and perhaps I should also remark that they are rather slow in starting into growth without a little excitement at the root, so that it is a simple matter to postpone the period of flowering to almost any period. Bulbs intended to flower next winter should be purchased at once, and potted up at intervals in the same way that we manage to bring in a succession of Hyacinths or Tulips. Any time after next January will be early enough to pot up the latest batch, which may be flowered in pots from 4 to 5 inches in diameter. The pots should be cleaned and carefully crocked in such a way that there will be no danger of the drainage getting stopped at any stage of growth. In potting take a good mellow rich loam, such as is used for Hyacinths, with a dash of coarse sand mixed with it ; press the soil in the bottom of the pots moderately firm, and place a little sand under the base of each bulb as a preservative against disease during the months of comparative inaction, which must necessarily take place, in order to have the flowers at the time required. The bulbs are placed at from one-half to two-thirds of their depth in the soil, and when the opera-

tion of potting is performed, they will require to be plunged in sand or other material up to the rim of the pot, with a shallow covering of sand laid over the surface of the pots as well. I should have added, with reference to potting, that the soil should be in a thoroughly healthy state, but rather on the moist side; the object of plunging and covering the surface of the soil in the pots being to prevent any loss of moisture by evaporation, and thus avoid the necessity of giving water before actual growth commences. As before remarked, the bulbs are slow to start into growth without the assistance of a little bottom-heat; and where such is the case a few of the bulbs may be pushed along about the beginning of May, merely giving them a start and hardening them off to stand in cold pits or frames during the warmest part of the summer. By dividing the stock into two or three lots, and by advancing or retarding their condition as appearance and circumstances may suggest, a few of those choice flowers may be attained till far on in the winter; but they are much more difficult to manage after September than at any time previous, on account of their dislike to a cold or damp climate. Even at a temperature at 50° they are subject to damp off at the base of the flower-stem if they are not prudently attended to with water; and the flowers also decay if the atmospheric conditions are not regulated and kept on the dry side before the house is closed up for the day. To sum up briefly, a temperature of 60° , and a dry atmosphere with a sparing supply of water at the root, are necessary conditions to insure a supply of flowers in November and December months. CULTIVATOR.



NOTES ON THE CULTURE OF THE HOLLYHOCK.

THIS stately autumn flower has within these last few years been gradually disappearing from gardens. Some six or seven years ago the plants of southern growers were affected with a disease which in a short time entirely destroyed every cultivated variety. This proved to be a fungus, commonly found on the wayside Mallow, though not affecting that plant to an injurious extent. Various remedies were tried to destroy the fungus, but up to the present time no remedy has been discovered capable of either preventing or curing the disease. Gradually creeping northwards, it is doubtful if, at the present moment, there is a collection in the country "clean." Late in the season of 1876 a nurseryman florist was discussing with me the points of what was then a pretty good selection of varieties; and when looking over some newish kinds, some of the dreaded fungoid spots were discovered. In the course of a few weeks the entire collection was blackened and gone. A few plants in the flower-garden escaped to some extent:

these have been left in the same positions, and so well did they look last season, that I fully expected to have got a fresh start with clean plants; but on inspecting them before winter, with a view to have them lifted and propagated in spring, the enemy was found to be still in possession. This summer, provided these plants are not seriously affected, I will propagate a number in cold frames. Growth under cool and moist conditions seems the only means of securing good spikes, and comparatively free from disease.

What I would recommend, and what I am doing myself, is to raise a stock from seed, and propagate any good variety which may be produced. When the seed has been gathered from fine flowers, there is a very large percentage of extra good varieties as the product, and a fair collection may be formed from these, provided always there are no Mallows in the neighbourhood, and no disease. Seed may be sown in autumn or in spring. When sown in autumn the Hollyhocks may be treated much in the same way as Cauliflowers, only raising the seedlings under glass instead of in the open border, and duly pricking them out under hand-glasses or in cold frames. I have found damp and slugs make sad havoc with the seedlings during winter. To sow in the beginning of March, and grow quickly, is better for the plants than to keep them hanging on in a torpid condition throughout winter. Boxes used for wintering Geraniums are very suitable for raising the seedlings in. Prepare these with a layer of coal-ashes placed in the bottom for drainage, cover the ashes with rough Mushroom dung, and fill up with a compost of three parts loam to one of old Mushroom dung. In sowing, allow at least an inch of space for each plant, and merely press the seeds into the soil so as to be nothing more than covered; place a sheet of brown paper over each box, and set them in a frame with a mild heat. When the seedlings appear, gradually increase ventilation until they can be removed to a cold frame, in which they will merely require protection from frost, cold winds, and cold rains. It will depend on the particular locality, soil, or climate, whether the seedlings can be transferred from the boxes to the positions out-of-doors where they are to bloom. If it is not safe to do so, the plants ought to be potted singly in 6-inch pots, draining these like the boxes, and using the same compost, potting only moderately firm. In the course of another fortnight they will require to be finally planted out. A spadeful and a half of half soil, half dung, with a little soot, and some artificial manure, such as Amies' Chemical, added, should be intimately mixed with the natural soil of the border where each plant is to be placed. This provides for the roots a ready medium until they ramify into the border around, and thereby secures a quick, strong growth from the first. The border itself should have been deeply turned up, and manure mixed into the entire depth. A depth not less than 3 feet should be aimed at; deeper than that, if possible. If the subsoil is unkindly, mix the dung into it without bringing it to the surface at all. A rich, free,

deeply-cultivated soil is a simple necessity in the cultivation of the Hollyhock. Stakes are very often placed in the ground before the plants. By doing so, there is no after-harm possible to the roots, as there is when not staked till required. The plants should be protected from surface drought by a mulching shortly after planting. With a properly-prepared border there ought to be no necessity to water the plants during summer. When started into full growth, attention is strictly required to keeping the flower-stalks loosely tied to the stakes with broad slips of matting. Any varieties which may be considered as possessed of qualities which would make their perpetuation desirable, should be cut over about the middle to the end of July, and the flower-stalks cut up into single eyes, leaving a leaf to each bit of stem and eye. It is hardly necessary to say that the flower-buds should be removed when preparing the "eyes." When ready for insertion, boxes may be filled with a sandy compost, into which the bits of stem are placed; or if a sufficiently large number are obtained, a cold frame may be prepared by placing in it 3 inches of the compost, and inserting the eye-cuttings therein at once. When roots are produced, prepare a frame for their reception during winter by placing a layer of Mushroom dung in it, and over this a layer of pure soil; plant the rooted cuttings firmly in this, and keep the frames open to all weather with the exception of frost or rain. The stools of the plants cut over as above will push out young shoots; these will strike if taken off during winter, and placed in a cool house. Hand-glasses put over them, further facilitates the process of rooting. The stools may also be lifted and potted, kept in an intermediate temperature during winter, and the shoots thus made taken off in the beginning of February, and grafted on pieces of root. The pots are to be plunged in a moderately brisk bottom-heat; but coolness is necessary for the grafts. Free watering is also necessary, and shading from direct sun. Directly growth commences, transfer to cold frames, and shift into larger pots.

R. P. BROTHERSTON.



STRAWBERRIES IN AUTUMN AND WINTER.

PERHAPS there is no time in the year more suitable than the present for saying a few words about Strawberries, when the minds of all engaged in forcing this indispensable fruit will be directed to their plants, in the way of getting ready, and introducing them into heat for their spring supply. As to the autumn supply, there is no reason why Strawberries should not be had the whole year round. What is more appreciated than a dish of fine fruit, say, when all other small fruits outside are done? That this can be accomplished I shall endeavour to show. Much depends upon when the first supply is needed. But that is best known to the cultivators,

who have different requirements to provide for. Plants, where introduced into heat for the early spring supply, will—if taken care of and gradually hardened off after the fruit has been gathered, then partially shaken out and repotted—again give ripe fruit towards the end of August or September. The time I consider the fruit most serviceable, is from the end of October to December, after which month Strawberry-growing is not so easy; and to have good fruit then, the plants must be properly prepared for the purpose. The most important point of all is the variety that is best for giving good fruit at that season. Vicomtesse H. de Thury has hitherto been considered the best; it is now superseded by a variety brought into notice by Mr Hinds—viz., Underhill's Sir Harry, a grand variety for all purposes, and none to equal it for fruiting through the dreariest months of the whole year. The fruit is very large, fine in colour, of good flavour, and continues to throw up its flower-spikes and fruit as freely in winter as in spring and summer.

Where a number of this variety are forced through the spring months, after the fruit is gathered, and the plants hardened off and placed outside in a north aspect, and rested for a time, they will be ready for being partially shaken out and repotted or planted out. They should have liberal supplies of water through the summer. During the month of August they will commence throwing up their flower-spikes freely; and those that were planted out should be lifted by the end of August and potted, placing them in a frame, and keeping them close until they are established. Shelves in vineries and cool Peach-houses are good places for them near the glass, where they set their fruit and flower freely, and can be introduced into the Strawberry-house as required. The air of the house must be kept as dry as possible, with a good circulation of air on all favourable occasions. If the air is allowed to become saturated with moisture, the plants soon go off.

I would, in concluding, point to Mr Hinds's great success in autumn Strawberry-growing: for instance, an excellent dish of fruit was exhibited by him at St George's Hall, Liverpool, on the 20th of November; and on the 7th of December I saw an extra fine dish just gathered—the fruit was of good flavour, good size, and well coloured. Mr Hinds will have Strawberries for some time to come—such fruit as many growers would be proud of in the spring.

WILLIAM BARDNEY.

[We received a small box of splendid fruits from Mr Hinds on 3d December. —Ed.]

LESSONS IN DRAWING, ETC., FOR YOUNG GARDENERS.

No. XXIII.

AT the commencement of these papers I pointed out that in drawing any geometrical figure, or group of figures in a geometrical design, it was first necessary to have two or more lines crossing each other at right angles at the centre of the figure or group, to keep all the parts exactly on the square. The same number of lines that are found necessary to draw the design on paper is required for the same purpose when laying it out on the ground. If a flower-garden has to be laid out on a piece of ground which has been levelled and is about to be turfed over, these lines may be marked out by laying a line and taking out shallow drills, such as are taken out for small seeds. The lines may be made perpendicular by the same rule given for drawing them on paper, using either of the compasses described in this chapter. It is, however, desirable to have a large T square for this purpose. This may be made by any joiner. The legs should be 8 or 10 feet long. The various centres, &c., can be measured from these perpendicular lines, pegs inserted to mark them, and the whole design traced out on the level surface. A number of pegs should then be inserted all round the flower-beds, but at a distance of 2 inches *inside of where the turf will ultimately be cut*, to permit of a good edge being got. When you have pegged out each bed, with a peg at each centre, the perpendicular lines are of no further use. The ground may then be lightly pointed over where the turf has to be laid, and the work proceeded with as before described. When a design has to be laid out on a lawn, lines will have to be stretched to serve as perpendicular lines, till the centres, &c., are accurately marked by inserting pegs. To facilitate the laying out of flower-gardens, and also in preparing flower-beds for planting, especially carpet-beds, a ground-compass is of very great service. A very good ground-compass may be made by any ordinary joiner. It may be made from 3 to 5 feet long, the wood being good, sound, well-seasoned Ash, 4 inches wide and 2 thick. The joint at the top, and the legs, may be formed similar to an ordinary drawing-compass; but instead of making both legs with sharp points, make one stouter at the end, and have it fitted into the top of a short stout peg, such as is shown at *a*, fig. 59, so as to form a joint, with a wood peg through it, the same as at the top. This is of much importance when working on soft ground, as the other leg can be extended to its utmost extent, while the peg *a* still stands firm and upright in the centre of the circle, keeping the circumference quite true, which would be more difficult to do were both legs alike. A compass of this sort should also be fitted with a semicircular piece

of stout sheet-iron, fixed into one leg and passed through an opening in the other, as shown, with a thumb-screw to fix it at any desired radius. The other leg of the compass should be reduced to a point, and shod with iron to keep it from wearing or getting broken. The beam-compass is an article which any gardener, with a little assistance from a blacksmith, may make for himself. Get two iron rods, 2 feet long and $\frac{1}{2}$ inch thick—similar to those shown at *a b*, fig. 60—pierced with small holes 3 inches apart. The rod *a* should have a thickish shoulder worked upon it, some 6 or 8 inches from its point, for the double purpose of steadying it in the ground and supporting the lath or beam part of the compass. Rod *b* should be made with a sharp point for tracing out figures on the ground. The lath should be 10 or 12 feet long, 2 inches wide, and 1 inch thick. Mark this off into feet and inches after the manner of a garden measuring-rod, and get it pierced with holes the same size as the iron rods at every inch of its length, so that rod *a* may be shifted to any desired point. These holes will not have to be made in one row along the centre of the lath, but in two or three rows, zigzag fashion, as there will be

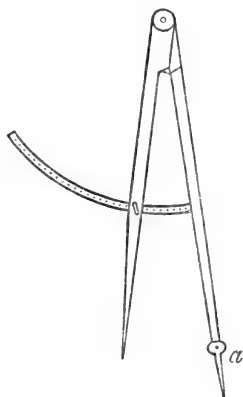


Fig. 59.



Fig. 60.

less chance of the lath splitting in two. By placing a short piece of stout wire through the hole nearest to the point of rod *b*, after passing it through the lath, it will prevent the latter from slipping off while the circle is being described by swinging it round by the handle of the rod. A similar piece of wire placed through either of the holes in rod *a* will serve to support the lath farther from the ground, should anything intervene between the centre of the circle and the circumference to make that necessary. It will of course be understood that in marking off the feet and inches on the lath, the measurement must start from the first hole, or that through which the rod *a* is to be placed.

Both these forms of compasses have a fault—their radii are limited. The simplest of all compasses for ground work, and which

has not this fault, is represented at fig. 61. This is simply a peg inserted at the centre of the circle, the looped end of a line placed

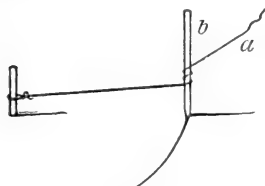


Fig. 61.

over it; the line is then put twice round a peg at the circumference, as shown in our fig., the loose end of the line being grasped and held tight by the left hand, while the peg *b* is held in the right. By this means a circle can be drawn quite as accurately as with a compass, and of any dimensions—it being only a question of length of line. If the line is

placed properly round the peg *b*, as is shown, the latter has only to be turned round to the right or left to increase or diminish the radius; and on this account, when once set to the proper radius, the peg has to be held very steady while tracing out the figure.

Just a few words more about cutting turf edges. In setting pegs round curved beds or edges of walks, for this purpose you must con-

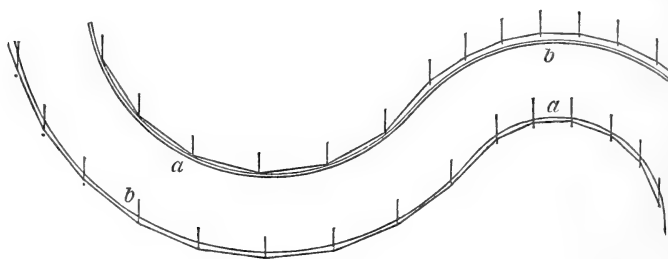


Fig. 62.

sider which side of the peg your line will occupy. At *a a*, fig. 62, the line is between the pegs and the walk—or, in other words, your edge is on the outside of the circle. In this case the edging-knife should come close up to each peg, giving it, as near as the eye can guess, the proper sweep between the pegs. On the other hand, when the line is behind the pegs, your edge being inside the circle, as seen at *b b*, the pegs must be placed a little farther back, so that when cutting the edging the knife will come up to the line half-way between the pegs, giving it the proper curve between these points, which will have the pegs more or less inside the edge. It is sometimes more difficult to cut a straight edge well than to cut round a curve. In doing this many make the mistake of cutting close to the line, and very often displace the line. In the first place, the line should be made very tight; and after making sure that all is right, place your right foot on the line about a yard from the end, and with the edging-knife make

a clean, straight cut, about half an inch from the line up to where your foot is on the line ; and then, before lifting your foot, place the edging-knife across the line to keep it in its place, while you move your foot back another yard upon the line. This process is quite necessary when there are any irregularities in the edging, if a straight edge is wanted ; and it is safe to adopt it even when the edge is quite smooth.

R. INGLIS.



HARDY WINTER GARDENING.

I HAVE been much pleased with your article on "Hardy Winter Gardening" in 'The Gardener' for December ; and as I have been for some years creeping on on the same lines, I think some of my experience may interest you.

For some years I took great pains to fill my beds, after the Pelargoniums, &c., were removed in October, with plants destined to bloom in spring, such as *Nemophila*, *Silene*, and other early annuals ; and as they came in too late, and lasted so short a time, I subsequently adopted the new *Violas*, which made a brilliant show, but had to be removed just when in greatest beauty. The centres of the beds were occupied by permanent patterns in the form of dwarf hedges of the Golden Holly, Silver Holly, Golden Yew ; and latterly the Golden *Euonymus latifolius* occupied a good space in the winter, but was removed to the kitchen-garden in the summer. I plant largely and permanently the *Euonymus radicans* as borders : but the *latifolius albo-marginatus*, of which I had a large quantity, was apt to die, and even if it lived, to turn green ; it is therefore discarded. I have now thrown aside all idea of a movable garden, which, in most places where it exists, is filled up with branches of Firs, Hollies, &c., and has the disagreeable effect produced by all *shams*. I have continued the marking out of the centres of scrolls and round beds with the *Euonymus latifolius aureus* ; *Thuja elegantissima*, which is of a brilliant yellow all spring and summer ; and *Retinospora aurea*, which always retains a deep gold colour. The Golden Yew looks very pale, except in summer ; but I think Barron's variety *Elvastonensis* will be an acquisition.

I have all the *Cupressus Lawsoniani* you mention, and one more, the *Pigrucea*, which makes a fine dark spot in the midst of white *Pelargoniums* such as Bridal Wreath.

Now, my idea has long been that masses of scarlet, white, and pink *Pelargoniums* in this climate, although brilliant objects when the weather is fine, are too easily blackened and thrown about by a heavy shower to be depended upon, and that a few dozens of good plants in small clumps amid the tracery of permanent shrubs, if not so dazzling

from any one point of view, would contribute more interest and pleasure to the garden. The only plants in your list that I have not are *Hedera arborea*, yellow and white.

The *Violas* have been transferred to a garden entirely for themselves, and were beautiful last summer up to September, when the beds were re-made for spring; and I have come to the conclusion that a summer and spring garden cannot well coexist. C.



CHANGE OF SOIL FOR FRUIT-TREES, ROSES, &c.

IN the cultivation of permanent plants—more especially of those requiring high cultivation—there is nothing of so much benefit as a change of soil. Tea-Roses—indeed all Roses—which have grown for years on the same spot, and which have been liberally treated with food in the form of top-dressings and manure-waterings, grow weakly and unhealthy in time. Tea-Roses which are annually lifted and protected, and when replanted in spring have a good quantity of wholesome loam placed next their roots, give greater satisfaction generally than those which are not so treated, but which are liberally manured instead. And common Hybrid Perpetual Roses, which stand for years in the beds and become irregular, when lifted, regulated, and replanted, do much better if some of the old soil be taken away and fresh maiden loam added in its place. Fruit-trees in heavily-manured kitchen-gardens generally do not thrive in the sense of making proper fruit-bearing wood; and although lifting and root-pruning certainly induces a better habit, the difference between those replanted in the old soil and those which are treated to new loam or intelligently-made-up compost is very marked. This is all very well known, and is often enough enforced; but the facts do not seem to be acted upon as they might. This being so, we have thought that a paper on the subject might help young beginners and amateurs whose trees may be in an unsatisfactory state, and which might be improved by a little well-directed labour. At the same time it may not be out of place to mention, that in order to succeed it is not enough to provide proper soil, and not enough to properly care for the roots of trees.

It is possible to do all that can be done and still not be successful. We have had many instances brought before us of failure and fruitlessness occurring simply because the *kinds* of fruit-trees, &c., were not suited to the climate. It is useless to expect success if varieties of fruit-trees are grown which *will not* ripen their fruit in an ordinary season. No greater blunder can be committed than

hankering after the finer kinds of Plums, Pears, and even Peaches, when the crops of the hardier Apples, &c., are precarious from an unfavourable climate. This by the way, however, merely as a warning to beginners.

Generally speaking, fruit-trees, Roses, &c., which are greatly benefited by lifting and replanting in fresh soil, have been growing in soil that is too rich. Excessive richness has a tendency to cause an over-exuberant growth; and when this occurs in a district not particularly favoured by sunshine, and where heavy rains prevail, the evil is aggravated. It is much more easy to cause unfruitfulness in fruit-trees and a scarcity of flowers on flowering-plants by manure in a cloudy climate than in a sunny one, and hence we ought to take this into our calculations. For successful fruit-tree cultivation in a cloudy wet climate, a hale loam on a dry bottom is an almost imperative necessity: a heavily-manured soil in such a climate will give great crops of wood,—while the same soil in a dry sunny climate will produce results diametrically opposite. Still, speaking generally, heavily-manured soils are to be avoided. But with wall and other trees in kitchen-gardens, it is impracticable to give the trees all the root-run that they require entirely to themselves. Vegetables should occupy the borders, and to grow these well quantities of manure have to be regularly added which very soon convert the border into a state unfavourable to fruitfulness in the trees. It would be to little purpose to say that for all this there were no remedy. But there is a remedy, and that is lifting and replanting, at the same time giving an addition of fresh soil to the tree-roots to run in. Few people who have not seen this done are aware of the effect on the trees: they become transformed into a condition of productiveness, whereas before they were the opposite. The difficulty is to get fresh loam. To many this may be easy enough; to the majority, we are afraid, it is an impossibility. And doubtless there are many who would have no difficulty about getting the loam, who are glad to leave the trees alone for want of labour-power; for it is a painful fact that many gardens are only half cultivated through want of strength. But where there is strength enough but no fresh soil, it is almost always of benefit to lift and replant over-luxuriant trees, using the best and cleanest soil at hand; for in numberless instances it is through overfeeding that barrenness is produced. It is not that the soil is exhausted, but it is because it affords too much.

In rich adhesive soils the roots of trees run out into great quill-like suckers-up of moisture and gaseous food, producing growth which the climate cannot ripen. This is more especially the case if the subsoil is wet and the roots are deep. We do not know

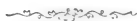
whether it has been demonstrated or not that the temperature of the branches is affected by the heat being taken away by the cold soil; but it has been satisfactorily demonstrated that the heat of the surrounding air is appreciably lowered by the evaporation of water from the leaves. This is one reason why trees with long fleshy roots in a humid subsoil do not ripen so well as those whose roots are in a drier and warmer soil, and are, when near the surface, warmed by the sun's rays into the bargain. And another reason is, as we said, because when the latter conditions exist the growth is sooner finished, and therefore there is more time to ripen it. In addition to what has been said, it may be remarked that solidity of soil favours earliness and fruitfulness.

We once had a hand in planting a quantity of fruit-trees—chiefly Plums—all of which were planted in good turfy loam. Some of these were planted in the ordinary wall-border, and others in a border having a walk over it close up to the wall. As this walk was subjected to a good deal of traffic the soil soon became very solid. The latter although they scarcely filled their places as rapidly as the others, are now much better furnished with fruit-buds than the former, and have borne much more fruit. Roses, planted under similar conditions, have given similar results,—harder, stouter, and more floriferous growth. Were it not for the trouble consequent on breaking up the walks when trees require removal, our idea is that, with a well-made border underneath, it would give better results to run our walks close to the walls all round than to crop the borders. But the question we wish to ask, and partly to answer here, is—Do we cultivate our soils with an eye to maintaining the trees in the best condition possible? We think that, speaking in a general way, we do not. The one idea generally prevalent in preparing kitchen-garden ground is to keep it in the best condition possible by adding annually quantities of stable-yard manure. Now the idea systematically carried out for a number of years ends in turning what may have been the finest brown or yellow loam into black garden-earth—rich, certainly, but pasty as putty if the soil is wet, and puddled into a most unsuitable state for fruit-trees by swarms of earth-worms, to say nothing of the other insect-pests engendered by garden soil of this description. When the soil is in this state, wall-trees do not bear as they do in good loam. The cure is repeated yearly in our calendars: “Lift, root-prune, and replant into well-firmed loam.” And the advice is good; but the practice which converts good loam into black garden-earth is not good practice. Of late years our kitchen-garden and our hardy fruits have not had the attention that “the houses” and the parterre have had [too true.—ED.],

and consequently the improved cultivation which has brought these departments into their very high state of cultivation has absorbed too much of the attention which ought to have been given to our hardy fruits and our kitchen-garden soils. We by no means blame gardeners for this state of matters. Fashion has led to our present demand for sensational parterres and perennial supplies of cut-flowers and decorative plants, and many gardeners have had to meet an overwhelming increase of work without any addition to their staff, and the inevitable result is neglect somewhere. But though this is true, it is also true that many do not give these matters the attention they might do and which they deserve. Our opinion is that soils are injured through getting too much farmyard straw dug into them. We have a great antipathy to soils which have lost the brown colour of their virginity, and we are certainly of opinion that with proper treatment they ought not to lose it. Were less stableyard straw dug into the soil, and its place supplied by the urine which is often wasted, this result would not so readily ensue. Practically it is an impossibility to turn brown loam into black garden-earth with urine—and practically the very finest kitchen-garden crops can be raised by its aid with very little solid manure, and the less straw the better. And many of our artificial manures might be profitably employed for the same purpose. And the same means which are useful to prevent soil losing its best properties are of equal use in restoring what is often called worn-out soil; and if deep trenching was called into aid the results would be better still. We have sometimes seen portions of large kitchen-gardens laid down in grass, kept close by sheep, and the improvement effected was immense. We once had a hand in clearing out the whole of the beds of a large parterre, and replacing it by soil from the kitchen-garden, and the results were most favourable. What we have written is not theory merely: we have proved it to be fact, and the course laid down we are in the habit of following. Loam is not always attainable, and in cases of this kind it becomes a double reason for maintaining the soils we cultivate as near that condition as possible; for although a change of soil for permanent plants is certainly as advantageous as for temporary crops, it is also as certainly true that permanent plants often—almost always—do ill because their roots are in unsuitable soil. When the soil is right the trees themselves find a change, because the roots are ever extending outwards to “fresh fields and pastures new;” and learning the lesson thus taught, we ought, when we lift and root-prune, to fill in the pit with other soil than that removed, even although the soil may seem quite the same. No plant takes quite the same kind of food from the soil as its fellow, and although we may only make an ex-

change, it may be fraught with benefit to the different subjects. This may often be accomplished by lifting, trenching, and replanting, as in the case of Rose-beds, and other things similarly planted.

ALEX. HONEYMAN.



THE CULFORD VINE SPORT.

As many of our readers will remember, a West St Peter's Vine at Culford had a graft of Alicante put on to it, the branches of the latter variety being again furnished with grafts or inarches of, among other sorts, Trebbiano and Golden Champion. In course of time the Golden Champion was entirely cut away, but the rod of Trebbiano was believed by some to have produced, the following year, a bunch of Golden Champion. Mr Thomson of Tweed Vineyards, as well as many others, thought that those who believed this occurrence had made a mistake. In order to convince Mr Thomson of the truth of it, eyes of the erratic Vine were sent to him, one of which was in due course grafted on to a Muscat stock. The produce of this bud or graft was six bunches of what Mr Thomson and many others have no manner of doubt is Trebbiano Grape. This of course does not count for much, for 'The Gardeners' Chronicle' considers that in all probability *only* said bunches are Trebbiano, and one "competent authority" thinks it may be *White Tokay*. The eyes taken from the *shoot* that produced the Golden Champion at Culford *died*. Some may say, "And no wonder, after such a prodigious effort." However, its "apparition," it is hopefully expected, may appear again next year after a "season's rest." This is the age of surprises. We have heard of a game the Americans term "per-hapses." This Grape case very much resembles it in its uncertainty. Perhaps Mr Thomson knows a Trebbiano from a Golden Champion or a Tokay when he sees it, and perhaps he does not. Perhaps the grapes he produced from the bud sent him were Tokays, and perhaps they were not. The Duke of Buccleuch Grape has been blamed for many evil ways, but never for starring it as a "ghosteses" in the provinces, although it has been so often murdered and put out of sight.

We are not quite done with the apparition yet, for it has appeared as large as life this year at Brayton Hall. This may account for its non-appearance elsewhere. At Brayton there is a bunch of Trebbiano with such enormously large berries, that we know of nothing so likely as that it should be mistaken for the Champion. When quite ripe, this bunch showed the tenderness of skin peculiar to Trebbiano and Golden Champion under certain conditions. The Vine at

Brayton is on its own roots, and has never been inoculated! Mr Hammond does not seem the least uncertain or nervous about this apparition, and we must leave to a contemporary the task of trying to "diddle" him into the belief that his Vine has, so to speak, the voice of Esau and the hand of Jacob. Has any one ever seen the wood and foliage of one variety of Vine bear the fruit of another?



NOTES ON POTATO CROP OF 1878.

LAST year I sent to 'The Gardener' a few notes on the varieties of Potatoes we had then under trial. It having been a very unfavourable season for Potatoes, as well as for most other crops, I decided to give them a further trial this year, along with a good many other varieties. This season may be considered a fair average one for Potatoes. I may mention, however, that from some local cause Potatoes are peculiarly liable to disease in the garden here: even in the most favourable seasons we are almost sure to have less or more disease, although there should not be any in the neighbourhood. Our soil is somewhat heavy, but on a dry bottom, consisting of sand and gravel, the good soil varying from 2 feet up to 4 or 5 feet. We are much closed in by trees, however, especially to the north, west, and south, and a 14-feet wall all round the garden, so that it may possibly arise from being too well sheltered.

The varieties I have enumerated below were mostly all grown on the same piece of ground, were all planted at the same time, and nearly all taken up at the same time—viz., the beginning of September. I have been thus late in sending the report, in order to see how they would keep after being stored, as they were all but free from disease when taken up. Some of the varieties I had last year nearly all went off diseased after I had written the report.

WHITE KIDNEY SECTION.

International Kidney.—Extra good crop, very large tubers, and of fair average quality.

Covent Garden Market.—Very good crop, tubers a nice size for table, and very good when cooked; a first-rate potato.

American Bread-fruit.—Extra good crop, very large tubers, but of good form; not first-rate, however, when cooked.

Prince of Teck.—In every respect very bad; discarded.

Mona's Pride.—A well-known variety, good crop of fair-sized tubers, and very good to eat.

Snowflake.—This variety, though generally classed with Kidneys, should, I think, be in another class altogether, being more flattish than kidney-shaped. A very fine crop of large tubers, and excellent to eat.

Jackson's Kidney.—Crop poor with me ; but a neighbouring gardener tells me it was about the best cropper he had : neither was it good when cooked, so I have discarded it.

Myatt's Ash-leaf.—Too well known to need much commendation : in every respect one of the best of its class.

Early Sandringham.—A fine crop of large tubers, very like, and quite equal to, Myatt's, though slightly different in flavour.

Lapstone Kidney.—Good crop of fair-sized tubers, flavour good, flesh firm, but not a mealy Potato.

Sutton's Prolific.—Very large crop, tubers of fair size, but only second-class to eat.

Magnum Bonum.—An extraordinary cropper, and tubers of splendid size and form. This variety was planted a long time after the other—in fact, very late—but was grown on a very rich piece of ground. I weighed the produce of almost every shaw as I lifted them, and found them to range from 5 lb. up to 9 lb. It is also of very fine quality when cooked, and has remained quite free from disease. Altogether this is perhaps the best Potato of recent introduction.

RED KIDNEY SECTION.

Early Sovereign.—Good crop, fair size, not good to eat.

Early Vermont.—Very good crop of large tubers ; soapy, but of good flavour.

Late Rose.—Good crop of large tubers ; fairly good when cooked.

Wonderful.—A well-named variety ; crop averaged thirty tubers to the shaw. The produce of ten shaws, taken in the order of lifting, weighed a little over 56 lb. Tubers of fair size, and very good to eat.

Bountiful.—Similar in appearance to Wonderful, but of somewhat deeper colour ; a good crop, medium size, and of fair average quality.

Ruby.—Fair crop, average size, and of pretty good flavour.

ROUND SECTION (WHITE).

Schoolmaster.—Fair crop of large tubers, good when cooked ; slightly diseased.

Model.—Large tubers, but in every other respect very bad ; discarded.

Porter's Excelsior.—Good crop of finely-formed tubers ; very good when cooked—an excellent Potato.

Thorburn's Early Paragon is a paragon of badness ; discarded.

Alpha.—Bad in every respect ; also discarded.

Eureka.—Fair crop, tubers large, and of fair quality.

American Early.—Fair crop of good-sized tubers, and of very good quality.

Giant King.—Fair crop, large tubers, but very bad to eat ; discarded.

Climax.—Good crop of nice-sized tubers, and of very good quality ; a fine table Potato.

Coldstream Early.—Fair crop, large tubers, and of very good quality.

Oxford Early.—Good crop of nice-sized tubers. This I consider about the best early round white Potato I have got, and in all respects, perhaps, one of the best in cultivation. I have grown it for years.

Fenn's Early Market.—Good crop, large tubers, good to eat, but badly diseased ; seems too tender for this soil, but might have been better if it had been taken up earlier.

Daintree's Early.—Middling crop, badly diseased ; discarded.

Dalmahoy.—Good crop, large tubers, very good to eat, but slightly diseased.

Rintoul's White Don.—A good crop of large tubers, and of good quality.

ROUND COLOURED SECTION.

Fortyfold.—A good crop of moderately-sized tubers, always welcome at table.

New Rose-end.—Fair crop, large tubers, but inferior when cooked, and diseased.

Rintoul's Striped Don.—Large crop, good-sized tubers, and of very good quality.

Nisbet's Don.—Fair crop, medium-sized tubers, and very good when cooked.

Red-skin Flour-ball.—Bad crop, badly diseased, and not good to eat; discarded.

All of the above, excepting those specified, were free from disease when lifted. I had those which I put away for seed looked over and examined about the end of October. The following list remained free from disease—viz., New Rose-end, Magnum Bonum, Early Sandringham, Oxford Early, Rintoul's White Don, Myatt's Ash-leaf, Ruby, Wonderful, Climax, Sutton's Prolific. The following were slightly diseased—viz., Coldstream Early, Porter's Excelsior, Snowflake, Fenn's Early Market, Nisbet's Don, American Bread-fruit, Covent Garden Market, American Early, and Schoolmaster. Those badly diseased as follows—viz., Fortyfold, Rintoul's Striped Don, Dalmahoy, Early Sovereign, Eureka, Bountiful, Early Vermont, Late Rose, International Kidney, and Red-skin Flour-ball. I hardly expect to be able to save any sets for planting of some varieties in the last-named section.

J. G. W.



DOUBLE WHITE HEPATICA?

IN the course of a paper on "Hardy Spring Flowers," read by Mr Robertson Munro before the Scottish Horticultural Association last month, he stated that while there were varieties of double red and blue Hepaticas, he was not aware of a double white one being in cultivation. Mr Munro is a very high authority on such subjects; but as it seems strange, I would feel obliged if you, or any of your readers, would say if you have met with such.—Yours, &c.,

THETA.



SCOTTISH HORTICULTURAL ASSOCIATION.

THE monthly meeting was held in the hall, 5 St Andrew Square, Edinburgh, on Tuesday evening the 3d ult.—Mr Dunn, president, in the chair. Mr L. Dow read a paper on the "Kitchen-garden." After a few preliminary remarks illustrative of the great importance of young gardeners making this branch of their profession the subject of special study, he gave in detail the modes he had practised for many years for the successful cultivation of Cauliflowers, Peas, Carrots, and Swedish Turnips, dealing with the latter chiefly for winter forcing—the roots being treated in a similar manner to Seakale, the blanched leaves alone being used, and as much appreciated as those of that vegetable.

Mr Robertson Munro followed with a paper on "Hardy Spring Flowers." These plants, he remarked, were unrivalled for beauty. He was happy to notice that after a long period of comparative neglect they were again coming to the front; more attention was being paid to their cultivation; and that in some gardens the flower-beds, which had hitherto stood empty for about six months of the year, were rendered interesting, and even gay, from January to May, and this at a trifling amount of trouble and expense. Among the plants suitable for the purpose he recommended the following, which generally came into flower in the order named, and which could be transferred if necessary, at the bedding-out season, to the reserve borders, and again arranged in the beds in the beginning of winter: *Helleborus nigra* and *nigra major*, *Snowdrops*, *Cyclamen coum*, *Winter Aconite*, *Scillas siberica* and *bifolia*, *Sisyrinchium grandiflorum* and *grandiflorum album*; *Hepaticas angulosa* and *triloba*, with its varieties; *Anemones apennina*, *nemorosa*, and *fulgens*; *Myosotis dissitiflora*; *Crocus*, various sorts; *Daisies* of sorts, the two showiest being the large flat-petalled white and the dark-crimson *Rob Roy*; *Primulas* of various sorts; *Aubrietias purpurea* and *p. grandiflora*; *Saxifragas oppositifolia* and *Burseriana*; *Puschkinia scilloides*, *Tulips*, *Narcissus*, *Alpine* and *common Wall-flowers*, &c.

Of the articles placed on the table for exhibition, the most interesting were specimens of a new seedling kitchen Apple, named *Earl of Moray*, from Mr Webster of Gordon Castle, which was stated to be an abundant bearer, and was found to keep well. Messrs Dicksons and Co. had two stands of *Chrysanthemum* blooms, including 63 varieties: the finest of these were *rotundiflorum*, pearl white, incurved petals; *Elaine*, large pure white; *La Belle Blonde*, blush, incurved; *Mrs George Parnell*, white, incurved; *Mrs George Rundell*, white, incurved; *Cardinal Wiseman*, bright reddish crimson, incurved; *Mrs Stewart*, ruby; *Prince of Wales*, violet purple; *Duke of Edinburgh*, rosy lilac; *Emblem*, rosy purple, incurved; *Gloria Mundi*, golden yellow; *George Glenny*, light amber, incurved; *Abbe Passaglia*, amber, incurved. A specimen of *Sibthorpia europea variegata*, growing in a shallow pan, and forming a dense cushion about twelve inches in diameter, from Messrs Downie and Laird, was very much admired; and in response to a call by the chairman, Mr Kerr, one of the foremen of the establishment, briefly described the treatment it had received. He believed that much of the want of success in its management was to be attributed to undue *coddling*. The soil consisted of about equal parts of leaf-mould and crocks broken very small, with a top-dressing of the smallest sea-gravel, through which the tender stem-roots rambled freely and sought into the soil. The plant had never been watered overhead, but was supplied with the necessary moisture by immersing the pan up to the brim for a few hours about once a-month in tepid water. The pan was placed in an ornamental vase, and had stood all the past season on a grated shelf in a shady part of the greenhouse covered with a bell-glass two or three inches larger in diameter than the vase, so that air was admitted freely from below.

It was intimated that at next meeting Mr John Sadler would read a paper on the "Physiology of Plant Life."



ROYAL HORTICULTURAL SOCIETY.

17TH DECEMBER.

FRUIT COMMITTEE.—Henry Webb, Esq., Vice-President, in the chair. Mr Dancer, Little Sutton, sent Reinette de Caux and Dutch Mignonne Apples, and the Committee were of opinion that the two varieties are essentially identical. Mr Moore of Warwick sent four varieties of seedling Apples. One, a seedling from Wyken Pippin, was a very handsome small dessert Apple of the size and shape of Golden Pippin. This was thought highly of by the Committee, but had been gathered too soon and had become shrivelled. Another, raised from Bess Pool, was also of excellent quality—tender in the flesh and of delicate flavour. These the Committee would like to see again. The others, too, were not thought to be an improvement on existing varieties. Messrs W. Paul & Son exhibited a dish of Theresia Nevill Pear, a new variety raised by Mr John Mannington, the raiser of Mannington's Pearmain Apple. It is of good size, rather irregular in shape, like Ne Plus Meuris, of a fine firm buttery flesh and delicate aroma, with a rich flavour. This is a valuable winter Pear, which will, no doubt, be heard of again. Mr Killick of Langley sent a dish of an Apple called King William—a handsome, somewhat flattened, highly-coloured Apple of very rich flavour, which was highly commended.

Sir Charles Strickland, Bart., reported on the varieties of cooking Apples that were submitted to his examination at last meeting. Dr Hogg, raised by Mr Sydney Ford, "very like the White Calville—probably a seedling from it. Melts perfectly, does not fall at all, juicy, slightly acid, very rich and sugary, delicate aroma. A first-rate baking-Apple. If the tree should prove hardy, healthy, and productive, this will be a valuable Apple. I should like to try its quality later in the season." This was awarded a first-class certificate. Mr Sydney Ford exhibited six dishes of Apples, to which a letter of thanks was awarded. Messrs Ross, Coates, & Co., Dunster House, Mark Lane, exhibited Apples cut in slices and dried, received from the United States. They preserved all the briskness and flavour of the fresh Apple, and were commended.

Mr J. Douglas, Loxford Hall, Essex, exhibited bunches of Golden Queen and Royal Vineyard Grapes grown in the same house and under the same treatment, the object of which was to show the unhealthy constitution of the former, which had begun to decay in every berry, while the latter was quite firm and fresh.

Mr G. F. Wilson, F.R.S., Heatherbank, Weybridge, sent dried fruit of Bananas, which were considered good as a sweetmeat.

Mr D. Wilson, The Gardens, Castle Hill, South Molton, sent two very handsome smooth-leaved Cayenne Pine-Apples, weighing respectively 8 lb. and 7½ lb., to which a cultural commendation was awarded. Mr W. Iggulden, The Gardens, Orsett Hall, Romford, sent a dish of Trophy Tomatoes, to which a letter of thanks was awarded. Mr R. Gilbert, of The Gardens, Burghley, sent a brace of Taylor's Montrose Cucumber Dispatch, to which a cultural commendation was awarded; also Cabbage Broccoli, which was awarded a first-class certificate for its high quality when cooked, the flavour being quite new in the Cabbage tribe.

Collections of fruit were received from Mr Gardiner, The Gardens, Eatington Park, Stratford-on-Avon, consisting of forty varieties of Apples and six of Pears, to which a silver Knightian medal was awarded; from Mr Killick,

Langley, Kent, thirty varieties of Apples, to which a cultural commendation was awarded.

FLORAL COMMITTEE.—Mr C. Noble in the chair. The entrance vestibule was completely filled with Messrs Lee's imposing collection of "hardy winter bedding-plants." Some of the "plants" were pyramidal variegated Hollies 10 to 15 feet high, and standard Hollies, standard and pyramid Bays, Yews in great variety and of various sizes, some of them drooping, some pyramids, some table-shaped, some cones, some vase-shaped, a few of the common being grafted with variegated kinds, thus having golden heads. Some trees of the Golden Spruce showed to advantage; also *Cryptomerias* in various sizes, with smaller specimens of *Taxodiums*, *Junipers*, *Thujas*, *Cupressuses*, *Retinosporas*, and suchlike elegant Conifers, amongst which were arranged, with great effect, standards of *Euonymuses* and *Ivies* of the Arborea section—some green, others variegated. These were on stems from 2 to 4 feet in height, with compact heads about a foot in diameter, and were extremely ornamental. The collection was further relieved by *Yuccas* and several plants of *Gynerium compactum elegans*. Along the sides of the groups were flat baskets artistically filled with dwarf plants, such as concentric lines of *Retinosporas* and *Euonymuses*, panels of plants of the same kinds; and some baskets contained masses of such plants as *Ligustrum sinensis tricolor* and *Euonymuses* edged with Box. This extensive collection embraced upwards of eighty species and varieties of shrubs and Conifers, all of which were in excellent condition, and attracted, and deservedly so, great attention. A gold medal was recommended for the collection.

Mr Bull was awarded a first-class certificate for *Lælia anceps alba*, a charming acquisition that will find its way into all collections. Mr Heims, gardener to F. A. Phillbrick, Esq., Q.C., Avenue Road, Regent's Park, was worthily and unanimously awarded a cultural commendation for a fine example of *Sophronites grandiflora*. It was growing on cork, and had upwards of fifty brilliant flowers. The same exhibitor sent *Odontoglossum Warscewiczii*, which somewhat resembles a pale variety of *O. vexillarium*. Messrs Hugh Low & Co., Clapton, were awarded a botanical commendation for *Masdevallia triglochis*, a tiny plant with leaves an inch long and one-eighth of an inch in diameter, and equally miniature flowers. Mr Green, gardener to Sir G. Macleay, Bart., Pendell Court, Bletchingley, was awarded botanical certificates for *Billbergia nutans*, with small drooping red flowers margined with purple; and *Grevillea fasciculata*. Mr Green also exhibited *Echmea Weilbeckii*.

Mr Gilbert, The Gardens, Burghley, Stamford, sent plants of his double *Primulas* with large flowers in various colours and fine foliage. Most of them had been previously certificated, and only one variety, Earl of Beaconsfield, was honoured on this occasion with a certificate. The flowers are very double, $1\frac{1}{2}$ inch in diameter; petals slightly fimbriated; colour bright rosy magenta. The long stems of the individual flowers of these varieties render the pips valuable for bouquets. A vote of thanks was awarded for the collection. Mr Smith, Ealing Dean Nursery, Ealing, exhibited about fifty plants of *Cyclamens* representing an excellent strain, the flowers being very fine, the whites pure, and the dark varieties rich, especially those ruby-crimson in colour. A vote of thanks was awarded. Mr Hepper, gardener to C. O. Ledward, Esq., The Elms, Acton, sent well-grown plants of *Solanum pendulum*, which resembles the old *S. capsicastrum*, but the leaves have distinct light midribs. It is an elegant variety. A vote of thanks was awarded.

Mr Cannell exhibited stands of cut Zonal *Pelargoniums* of wonderful excel-

lence. The varieties were Henry Jacoby, Lizzie Brookes, Belle of Surrey, S. Holden, Dr Denny, D. Thomson, M. Panton, The Shah, Mrs Leavers, Mr Pollett, Rienzi, Circulator, Kleon, Remus, Mr Chandler, A. Henderson, Titania, Louisa, Miss Gladstone, Mrs Whiteley, Col. Seeley, Lady Sheffield, and Mr Palmer,—all represented by grand trusses, and producing a rich effect. A stand containing twenty-four trusses of White Vesuvius was charming, and almost equally so was Salmon Vesuvius; the striped variety was also well exhibited. It is noteworthy that one pip of White Vesuvius had two bright scarlet petals, the other three being pure white. This was the finest collection of its kind that has ever been seen in December; in fact it would have done credit to any man at any season. A vote of thanks was worthily awarded.

Mr George sent a seedling Abutilon Rose Queen, but it was passed by the Committee. Mr Thomson, Crystal Palace, sent fruiting sprays of Eucalyptus globulus. Mr Noble exhibited Thujopsis borealis aureo-variegata; and an ornamental tin plant-suspender was exhibited by Mr Peter Selby, 15½ Nuttall Hill, Birmingham.

The thanks of the Committees were tendered to the chairmen and the Secretary, and the last of a successful series of gatherings during 1878 closed with a mutual interchange of courtesies. Many of the meetings have been rendered additionally instructive by elucidatory remarks by Mr Jennings, the Assistant Secretary, and other gentlemen; and Mr Barron and his assistants have exercised their usual assiduity in having the arrangements as complete as possible, and convenient to all.—*Journal of Horticulture.*



Calendar.

KITCHEN-GARDEN.

FROSTY weather in January, clear and dry, is what is most desired both for the benefit of field and garden, and all who have their vacant soil thrown up in ridges will in most cases have reason to be thankful for the cultural advantage of the pulverising frost. But it is often experienced in damp localities that soil of a tenacious character is better adapted for seed sowing and planting when turned up as it is wanted. These circumstances are peculiar, and can only be ascertained by personal observation. Trenching should be done to some extent every year. In very heavy wet land it may be done as often as circumstances will allow. A well-trenched garden seldom suffers either from wet or drought. Drainage is, however, always an important matter, and in extra severe winters the well-drained land will show many advantages over that which retains the moisture. If snow should be lying on

the ground it would be well not to dig or trench it down, except the soil should be very shallow, gravelly, and poor: in such cases we never saw snow do any harm. When land is wet and thawing, it should not be trodden. Manure may be wheeled to all spaces which require enriching; but that work should not be done at random, but some arrangement made for guiding the operations of the coming season, giving manure in proportion to the poverty and shallowness of the ground, and according to the requirements of the crop to be grown on the space. Decide on the extent of ground required for each kind of vegetable. Experience of the demand, however, is the real guide: we would say, have abundance of everything; crop closely and in quick succession, and never have ground lying idle when it can be under crop. Small gardens in proportion to the demand of a family require extra care in

cropping them, so that the supply is as large as possible, and that there should be no glut of one thing and scarcity of another : change often, if only for the sake of system. Well-cultivated gardens give no cause for fear of failure by allowing one crop of the same species to succeed the previous one. Trenching is an effectual remedy for this ; but as an example, we would not let a crop of Carrots be grown where a crop of the same root had been previously destroyed by grubs or wire-worms. We would not give manure for Carrots, Beet, or Parsnips, to the amount that would be suitable for Cabbage. Rank manure gives coarse, badly-flavoured roots ; poor dry land gives tough, stringy produce ; ground deeply trenched and well broken suits all roots and tubers. If manure is very rank, we prefer trenching it down in quantity under the second spit ; but rotted manure, mild and wholesome, may be placed under the top spit. When ground will allow the necessary "barrowing," manure should be wheeled on vacant spaces and covered with soil to prevent wasting of its virtues : ridges a yard high, run across the plots, answer well when it is to be turned in at a future period. Potatoes do well in ground which has been thrown up into ridges, and some fresh soil (turfy loam is excellent) placed over the tubers when planted. On tenacious land, where disease is often an unwelcome visitor, rank manure is productive of the evil, especially when the Potatoes are late kinds. The thawing of such vegetables as Celery should be of a gradual character : leave the litter placed over the plants as protection till the frost is gone and the ground thawed. Then the litter or fern used for protection may be removed. Laurel or Spruce branches, in the absence of better material, is useful as protection. Pieces stuck among early Peas or Cauliflower plants act as a useful protection : quick thawing is the difficulty which tender vegetation cannot easily stand against. There should be stores of all kinds of hardy roots under cover sufficient to the demand during frosty weather ; or if it is preferable to dig Horse Radish, Parsnips, Jerusalem Artichokes, Chicory, Scorzonera, Salsafy, or Potatoes fresh out of the ground as they are wanted, a covering of litter, half-rotten

leaves, fern, or other material should be placed over the beds to keep frost out of the ground.

The seed stores should now be overhauled, and those of value, new or old, should be noted ; and when the seed-list is made out, superfluous quantity should be avoided. Old favourite sorts should not be discarded for others which may prove to be fine only in name. A few novelties sent out by respectable men should have a trial. The store for seed should be vermin-proof, well cleaned, and if necessary to eradicate beetles, spiders, &c., a fumigating of sulphur may be made. In severe or wet weather seeds of choice kinds saved during the past season may be cleaned. Stakes may be made, and all the ordinary items attended to under cover, which, when done, will do much to facilitate labour during the busy season.

If weather will allow, the present season is a good one to prepare early borders for choice early crops. Where there are no borders under the shelter of walls or other fences, it is a good system to raise slopes facing the south, and board them up behind, or leave them as spans facing north and south : for early crops the latter aspect is of great advantage for early vegetables, such as Horn Carrot (French Nantes are favourites), Early Radishes, Dutch Turnips, Lettuce, Spinage for first crop, Early Potatoes, or anything to come in early. Peas and Beans may be sown when weather will allow : a mixture of wood-ashes with red-lead sprinkled over the seed will do much to ward off the attacks of mice or rats. Peas sown wide apart, to be staked in due time, give shelter to other early crops which may be sown between the rows. Broad Beans or Spinach between the Peas answer well for present crops. Peas of two or three kinds may be sown in boxes with turfy soil in the bottoms, and covered with charcoal-dust, fine light soil, or old Mushroom-dung. They may be protected when frost appears, otherwise all the light and air possible may be given them. It is common to raise first crops of Peas in pots, tiles, strips of turf, and by other means, placing the seed in moist heat till they have grown into green foliage ; but when never placed in heat at all, and grown with all the light and air possible,

they are more easily managed when turned out. This applies to Broad Beans and all other crops brought forward for earliest supplies. Asparagus may have manure placed over the rows—that which is to be lifted should be well protected. In low-lying localities there is a danger of destroying Asparagus by heavy close coverings. Prepare leaves and manure for beds by mixing them well together, preparatory for forcing early vegetables. Lettuce and Endive for present use may be protected by hoops and mats: a frame placed over a portion is good protection. Pot Mint and Tarragon, the forcing of Rhubarb, Seakale, Chicory, and Potatoes may have the same attention as recommended last month, keeping up steady supplies as demand requires. A small mushroom-bed may be made often in preference to large beds at long periods. The frequent formation of small beds is more likely to meet the supply regular and proportionate. Tomatoes may be kept growing under all the light at command, giving air whenever the

weather will allow it. Cold frosty winds must be avoided. Those supplying a few fruit must not be over-watered, or kept in a close high temperature: rotting at the collars often happens when water has been used freely at the surface, while the roots at base of soil have been starved. Mustard, Cress, Thread Onions, and other small salads may have attention by sowing often, as formerly recommended. Always let them have airy quarters with plenty of light for some days before they are sent in for use. This gives flavour and crispness. Potatoes may be sprouted in gentle warmth preparatory for planting in the frames or pits. Those growing in pots must not be coddled or kept far from the light; neither will they stand cutting frosty winds. French Beans may now be sown for successions every ten or twelve days. Withhold the syringe when they are flowering, and sow Carrots of Horn kinds on mild hotbeds: sow Radishes between the Carrots.

M. T.

FORCING DEPARTMENT.

Pines.—In order to have ripe Pines in May and June, a number of the earliest Queens that have been kept comparatively dry and cool for the last ten weeks or more, and that are likely to show fruit without making much growth, should be placed in warm quarters by the middle of the month. Their pots should be plunged to the rim in a bottom-heat that does not exceed 95°, or fall below 85°, and where the plants will get every blink of sunshine. Presuming that, according to former Calendars, these plants have been kept at 60° at night, the temperature should now be from 65° to 70°, according as the weather is mild or cold, with 10° more by day before giving air. If the nights be cold and the days bright, let the temperature be regulated accordingly, applying the minimum night and maximum day temperature. The plants, having been kept dry at the root for some time, should have a soaking of water at 85°, and be kept steadily moist. In cases where the plants show any signs of continuing to grow instead of fruiting, do not give so much water. The atmosphere

should be moist, but not to such an extent as will cause drip to condense on the roof of flattish pits and fall into the centres of any of the plants. This is generally a cold month, and it is not advisable to increase the temperatures of succession-pits. Be content with 55° at night; and when with sun the day temperature rises above 70°, give air for a short time, always shutting up early, so as to make it unnecessary to fire so hard to keep the heat up in the early part of the night. With hard firing, both the atmosphere and the soil must be watched, and not allowed to become parchingly dry, or the result may be that young stock well rooted in small pots may start into fruit instead of growth when shifted the next and following months. This is particularly applicable to plants supplied with bottom-heat from hot pipes. Beds of leaves to receive those that will be shifted a month or six weeks hence should now be prepared; so that any violent heating may have subsided to a safe point by the time the pots are plunged in them. Sometime during the course of this month get the soil to be used

for potting next month prepared and put into some dry place where it will get warm by the time it is wanted: a moderately light loam that has been stacked eight or nine months, with all the finer particles of soil shaken out of it, is best, where the loam is of a heavy nature. Mix pounded charcoal and sand with it to keep it open. All pits that can be covered with frigidomo or mats at night in severe weather should be so dealt with; it not only saves fire, but is much better for the plants: most especially is this applicable to Pines now swelling off, and that do not make much progress at a lower temperature than 70°.

Vines.—What has just been said about hard firing in the case of Pines is applicable to Vines that have been started a month or six weeks ago. Avoid high night-temperatures, and make the most of sun-heat by day. Vines now bursting into leaf will make weakly wood, with long joints and thin yellowish leaves, if forced hard at night when the nights are long and cold. Fire-heat is a necessary evil, but when accompanied with darkness the evil is much aggravated. Therefore let the chief of the firing be done by day with light. Where Grapes are wanted early, a night temperature of 55° when cold, to be run up by day to 70° or 80°, according to the aid derived from sun, is sufficient. An amount of moisture must be put into the air to counteract the parching effects of the fire-heat, but no more. Avoid steaming from hot pipes as a great evil. Stop the young growths two joints beyond the best bunch, and tie them down before their points touch the glass; but do not attempt to bring them to the wires at once, or they may break off. In thinning off superfluous branches leave the most compact and shortest-stemmed ones. When the young growths are broken about an inch, do not raise the night temperature much, but take advantage of sun-heat by day to make up for the slower growth at night. A succession-house may be started by the end of the month; and as the days are longer and the sun stronger, the starting temperature may be a little in advance of that directed for early-started vines. A night temperature of 55°, with a rise of 10° or 15° with sun by day, will not be too much, unless the weather be severe and sunless, when

it may be regulated at 5° less. Where there are only two vineries, the earliest may be shut up by the end of the month and the night temperature kept from falling below 50°. See that the inside borders are kept healthily moist, and that outside ones are, to say the least, well protected from frost and cold winds. All Vines started before the 1st of January should have their roots in inside borders exclusively. Prune all Vines from which the fruit is cut, and dress the wounds with styptic, to prevent their bleeding when the sap rises. If there has been any spider or thrip on them last season, remove all loose bark, scrub the Vines well with soap and water, and then dress with Simpson's Wash or Gishurst's Compound. Regulate the temperature of vineries where fruit is still hanging from 45° to 50°, and give air when fine, but shut up closely when drizzly or foggy. In any houses where most of the crop is cut, the remainder may be bottled, and the Vines can then be pruned and put ready for starting at the proper time. Where sites are being prepared for new Vine-borders, let the drainage be through not less than a foot of broken stones or bricks; and if the subsoil be a cold clay, the foundation should be paved or concreted, with a good fall to a front main drain, so as to make sure that water can never become stagnant or the roots get into bad soil.

Peaches.—Where early Peaches are set and have cast their blossoms, the night temperature may be advanced to 50°, and to 55° by the end of the month, with 5° to 10° more by day. Syringe the trees every fine day, and give more or less air daily. See that the inside border does not become too dry, especially that part of it about the hot-water pipe. Disbud the young growths by degrees, ultimately leaving a strong bud at the base of each fruit-bearing shoot and the leader. Where the fruit has set in abundance, the trees may be relieved at once of all fruits that are malformed, and those that are on the right, left, and north sides of the shoots, but always leaving plenty on which to "come and go." Go over trees in bloom in the middle of the day, and impregnate them either by dispersing the pollen with a fine brush or by a few raps of the hand on the trellis. If the weather be bright, they set equally well when the

pollen is dispersed, with water applied with a syringe, for the operation, so far as the cultivator is concerned, is purely a mechanical one. Shut up a succession-house, and keep the temperature from falling below 45° during cold nights, increasing the temperature to 50° by the time the bloom is opening. All trees in later houses should now be pruned and tied, the borders top-dressed, and well watered if dry. In the case of young trees planted last year, avoid the too common practice of cutting them back; if the shoots are ripening, leave them their whole length. The furnishing of the tree with young wood can easily be regulated by timely and judicious disbudding, by which so many canker-producing wounds are avoided, and the trees increased in size and a state of bearing in half the time taken in the cutting-and-slashing-back system. Where young trees are to be planted or root-pruned, lose no time in completing the operation, if not already done.

Figs.—Figs in pots started as directed last month will be breaking into growth, and should have the temperature advanced 5° ; and, as in the case of early Vines, let the forcing be chiefly done by day with sun. Keep the atmosphere moist by syringing the plants, the surface of the bed, and the paths, taking care that they are never allowed to become dry at the root. Look over them at intervals, and rub off superfluous buds ultimately, just leaving enough to furnish the plants without crowding. Figs grown in restricted inside borders may be started at the end of the month at 50° at night. Give the border a thorough watering if dry, and syringe the trees two or three times daily.

Melons.—Sow for an early crop about the middle of the month, in a temperature of 70° . To prevent any check from transplanting or "potting-off," sow a few seeds in 4-inch pots

half filled with soil, and thin out the plants to one in each pot. As soon as they show the rough leaf, commence to add to the surface of the soil till the pot is nearly full. Pure loam is the best soil to sow in. Keep them near the glass in a light house, and give air regularly to keep the plants stocky, but beware of exposing to frosty currents of air.

Cucumbers.—Sow and treat the young plants as directed for Melons. Plants that have been bearing through the winter will now be the better for being stimulated as the light increases. A mulching of old mushroom-bed dung, and a little loam mixed with it, is a good top-dressing for them; and an occasional watering with clear soot or guano water puts colour and substance into the foliage. Keep the temperature at from 65° to 70° at night, with a rise of 10° by day. Increase the moisture in the air as the light increases. Should any signs of mildew appear, use Speed's Eradicator, which is the most instantaneous remedy for mildew we ever used.

Strawberries in Pots.—Very early plants will come into bloom this month, and if much fire-heat is used, they will not set well. 50° in cold, and 55° in mild nights, ought not to be exceeded. Do not expose the blossoms to currents of cold air; and if necessary, fix some hexagon netting or perforated zinc over the ventilating openings to prevent such. Do not stand plants in saucers of water; and if anything be placed under them, let it be cocoa-nut fibre or a thin strip of turf. When set, raise the temperature 5° , and run up the house to 75° with sun-heat at shutting-up time. Introduce more plants into heat. Peach-houses shut up for forcing are good places for them, if there is not the convenience of a pit or house that can be devoted exclusively to Strawberries.



Notices to Correspondents.

All business communications and all Advertisements should be addressed to the Publishers, and communications for insertion in 'The Gardener' to David Thomson, Drumlanrig Gardens, Thornhill, Dumfriesshire. It will further oblige if all matter intended for publication, and questions to be replied to, be received by the 14th of the month, and written on *one side* of the paper

only. It is also requested that writers forward their name and address, not for publication unless they wish it, but for the sake of that mutual confidence which should exist between the Editor and those who address him. We decline noticing any communication which is not accompanied with name and address of writer.

T. L.—You will find a paper on Tuberoses in our present issue, which, we hope, will meet your case.

JOHN FORBES.—*Monochaetum ensiferum*, a beautiful greenhouse plant.

AN OLD SUBSCRIBER.—To ripen Vines, heat, light, and dry air are the necessary agents, and not cold. Moderate frosts will not injure well-ripened Vines, but our own practice is never to expose Vines to more than a few degrees.

J. H.—An article on Violets in pots for winter use will appear in our next issue.

J. S. K.—No. 1, *Euonymus latifolius*; No. 2, *Euonymus japonicus*; No. 3, *Berberis*,—but we cannot say which. To a great extent we are compelled to guess-work in the case of specimens sent to us as you have sent yours. If you will send again packed in a little damp moss, in a tin box that the post-man cannot smash, we will be able to judge more correctly. Send larger specimens.

C. S.—Your questions would require a whole treatise on Melon-culture to do them justice. We prefer a half-span pit running east and west, with a bed of soil about 3 feet wide, with two rows of pipes under it for bottom-heat, and—for ripening Melons not earlier than August—3 rows of 4-inch pipes for top-heat. The pit should be high enough to give plenty of head-room without the head coming in contact with the hanging fruit. Sow at the middle of May and again in June. Try Golden Perfection and Dell's Hybrid.

J. K.—It is entirely impossible for us to state what breaks the leaves of your *Yucca*, because they may get broken in many ways. A man, or some animal, or the wind, may do it; but from anything you tell us we cannot guess which of them does it.

L'ALLEGRO.—No. 5, *Sericographis Ghiesbreghtiana*. We cannot undertake to name varieties of florist flowers.

A LOVER OF FLOWERS.—Almost any nurseryman can supply you with *Gynesiums*. We never recommend nurserymen or tradesmen in these pages. 'Botanical Names for English Readers' may, perhaps, suit your purpose, and 'Treasury of Botany.'

CO. DOWN.—At the office. I. & W. Rider, 14 Bartholomew Close, London, or from any bookseller, price 1s.

G. F.—The circumstances you describe must be the cause of your Grapes shrivelling so very prematurely. The cold and wet paralyses their whole system, and they are never properly ripened; and Grapes not thoroughly ripened cannot and never do keep long without shrivelling. Get rid of the wet thoroughly, and, other things being equal, your Grapes will ripen properly. *Allamanda Hendersonii* is a very free bloomer, and will suit your purpose.

We will be glad to receive note of the lowest temperature registered by our correspondent since December 1. On December 20 it was 28° below freezing at Drumlanrig.



ERRATA.

At page 542 of last month's 'Gardener,' 24th line from the bottom of the page, for "One could not but admire," read "One could not admire."

At page 543, 13th line from the top of the page, for "enormous plates," read "common plates."

At same page, 10th line from the top of the page, for "the *Gladioli* coming from England," read "the best *Gladioli*," &c.

THE GARDENER.

FEBRUARY 1879.



SELECTION versus COLLECTION.



LAST month we advocated the growing of very limited selections instead of large collections of Apples, as being much more likely—as a general rule—to produce a greater abundance of fruit. The same rule, we are convinced, applies to every other variety of fruit, from the Pine-Apple to the Currant or Strawberry; and if this rule had been more frequently followed, the supply of fruits would, in numerous instances, have been much more satisfactory, and their culture to no inconsiderable extent simplified. Nor are fruits the only occupants of our gardens to which it would be well to apply the rule—vegetables and flowers, to our mind, require its application quite as urgently; always, of course, making the selections to suit the locality and the wants of the family.

We have often looked with something like pity at the one, or it may be, two or three vineries, into which have been crammed pell-mell ten or a dozen varieties of Grapes, many of them decidedly coarse and inferior; and for the mere sake of having so many varieties, the whole have to be trained much too closely together. Four, or six at most, of the cream of our present numerous varieties, allowed ample room, would yield a far more satisfactory supply of fine Grapes than double that number of varieties. When six of the cream of our Grapes are included in any extent of vineries, on what point, we would ask, would a good judge of Grapes regret the absence of any of the others? Would it not be well for horticultural societies in offering prizes annually—as they have done for some time now—for eight varieties of Grapes, to cut the number

down to six, and specify the sorts that would be admissible? True, this might keep out our Syrians and Trebbianos, and others which have no merit, comparatively speaking, either in quality or in their culture. This might cause the exhibits to look less imposing to the general public who visit horticultural exhibitions; but to merely make the public stare should not by any means be either the alpha or omega of shows. If anything comes within the legitimate scope of horticultural societies, it certainly is to encourage the culture of the finest, and not the coarsest, varieties, which latter are certainly not the crucial test of skilful or meritorious Grape culture. It is something like a shame to gull the public with monstrous bunches of coarse Grapes instead of educating them by bringing merit before them. We are certain that no Johnston, or Hunter, or Fowler, will ever think of pinning his reputation to his monster bunches of coarse sorts instead of to his fine Muscats and Hamburgs, &c.

These foregoing remarks apply with equal force to Pine-Apples, Peaches, &c. When three, or four at most, of Pine-Apples are cultivated, we doubt if the addition of another variety more would improve the selection in point of flavour and general usefulness. It would only be a waste of space to refer to other fruits, beyond again expressing our conviction that this rule applies to them all.

Turning to the Vegetable department, and taking, as illustrative of what we are contending for, Peas, Cabbages, and Lettuces, we have no hesitation in saying that in numerous instances one half of the varieties cultivated would greatly improve the character of the supply, and simplify the matter of sowing, naming, &c. Gardeners who have practised for many years, and who have the largest supplies to keep up, come to very much reduce their catalogue of vegetables instead of extending it, and so far differ from beginners and men of less experience.

Looking at flowers, of which there are many species or varieties, our rule might in many cases be applied with rather a sweeping hand. Take Roses as an instance. What a galaxy of names we find, many of which differ from others more in name than anything else, there being just a shade of colour and form of difference between many of them. Would it not be much the better way to select the best and most useful of several, which have so little difference the one from the other? A selection of three or four dozen of Hybrid Perpetuals, selected according to soil and climate, would be much more satisfactory in hundreds of cases than double that number.

We might run over the whole of Florist Flowers, Heaths, Azaleas, Orchids, &c., and still be within the limits of the applicability of this

rule of moderate selections. To any grower who has a hobby or yearning, and room for mere collections, we have nothing to say; but to all who have a show and supply of flowers to produce for given purposes, we would say, make comparatively small selections and you will not regret it. It is the principle we act upon ourselves, and find it much preferable to collections for the sake of variety.



HEATING BY HOT WATER.

ALTHOUGH hot water circulating in pipes has been adopted and recognised for many years past as the best system of warming plant-houses, yet there exists at the present time, among hot-water engineers and gardeners, considerable difference of opinion regarding the best shape or form of boiler to employ in which to heat the water in the first instance. And there is no doubt that among the different shapes of boilers in use at present, the form of some is better calculated to answer the purpose in view than that of others. It is not, however, our intention in this paper to discuss the merits or demerits of any particular kind or pattern of boiler, but to direct attention to one or two matters in connection with the fitting up of a heating apparatus that both engineers and gardeners are agreed upon as being essential to a rapid circulation of the water in the pipes, whatever shape the boiler may be. We allude to the practice of sinking the boiler below the level of both the flow and return pipes, and giving the flows a continuous ascent from the top of the boiler to their furthest points of extension in the building or buildings to be heated. This method of fixing up a hot-water apparatus has been so long adopted, and attended with such an amount of success, that the soundness of the practice may to some appear beyond dispute. Notwithstanding, we do not hesitate to say that the circulation of the water in the pipes will be as rapid with the bottom of the boiler one foot below the level of the return pipes as it would be supposing the boiler was sunk several feet deeper. And instead of a continuous ascent of the flow pipes throughout their whole length being necessary, or in any way contributing to the rapidity of the circulation, this way of fixing them tends to retard the process. If we succeed in showing that a continuous rise in the flows hinders rather than accelerates circulation, the argument in favour of placing the boiler so much below the general body of the pipes will disappear, and the expense consequent upon excavating, draining, and building a deep stokehole, will in many cases not need to be incurred. Under certain circumstances, however, a deep stokehole is a necessity, as, for instance, when the pipes in passing from the boiler to the buildings to be heated have to cross under outside paths. In this case, as well as in some others that could be mentioned, a deep

stokehole is unavoidable. Before stating the grounds on which we say that a continuous rise in the flow-pipes is a hindrance rather than otherwise to the circulation of the water, let us inquire the reason why circulation takes place under any method of fitting up the apparatus. The primary reason why water circulates or moves in the pipes is in consequence of the minute and separate particles of which it consists being unable to impart heat the one to the other. If the particles of water were capable of transmitting heat to each other in the same way as the particles of which solid bodies are composed are, it would be impossible, either through the application of heat to the boiler or by any method of fitting up the apparatus, for circulation to take place in the pipes. We would also here observe that in consequence of the inability of the particles of which water consists to communicate heat to one another, every particle of the body of water contained in the apparatus at the time of lighting the fire must come in contact with the point on which the latter acts, and again in contact with a colder point in the apparatus, before it can contribute to the general warmth of the structure to be heated. The immediate reason, however, why the water circulates in the pipes is because of the inequality of the specific gravity of the particles at different points of the apparatus, the inequality being caused by the application of heat to a particular point, while the water is being cooled at all the other points.

Perhaps our young readers will better understand what is here meant if we say that when a fire is lighted in the furnace beneath the boiler, the material of which the latter is made transmits the heat generated by the combustion of the fuel to the particles of the water in direct contact with the inner surface of the metal, thereby raising their temperature, in consequence of which they expand and become of less specific gravity, or lighter in proportion to their size than the colder particles above them. Here the law of gravitation as it applies to liquids comes into operation, and in obedience thereto the heated or lighter particles ascend, their place being instantly occupied by descending colder or heavier particles; and this ascending of the lighter and descending of the colder particles is what is called circulation of the water, and goes on until the whole body of water contained in the apparatus becomes of the same temperature,—an occurrence not likely to take place so long as the fire is kept burning, unless the boiler power is very much in excess of the work it has to perform.

We will now endeavour to show why the rise in the flow hinders rather than accelerates the circulation of the water in the pipes. A hot-water apparatus fitted up on correct principles will have its highest point of action occupied by the hottest, and its lowest by the coldest, volume of water contained in the apparatus, the intervening points being occupied by volumes gradually descending in the scale of temperature, as they recede from the former towards the latter point. Now, when the flow-pipes gradually ascend from the highest

point of the boiler, throughout the structures to be heated, it is impossible for the hottest volume of water contained in the apparatus to occupy the highest point of the latter, when heat is applied to the boiler. The reason for this is plain: as soon as the fire acts on the boiler, the particles of water in contact with its inner surface bound upwards, continuing to do so until they come in contact with the inner surface of the upper side of the flow-pipes. Here the particles immediately part with a portion of their heat, and consequently become of greater specific gravity than they were at the time of starting on their upward course, and would now commence to descend towards the point from which they started, but that they are still lighter than the particles composing the body of cold water contained in the flows at the time of setting the fire agoing: hence the partially cooled particles proceed along between the colder body of water and the inner surface of the upper side of the flows, continuing to do so until the cold water has found its way to the boilers in a contrary direction. Thus, to begin with, we have two bodies of water of different degrees of temperature moving in opposite directions in the same pipe, and at the same time. This fact hot-water engineers admit, but tell us that as soon as all the water in the flow-pipes becomes of equal temperature the process will cease; and no doubt it would, providing it were possible for all the water in the flows to become of an equal temperature. This, however, cannot occur in an apparatus of any great extent so long as combustion takes place below the boiler; and for this reason the water, as it travels from the hottest towards the coldest point of the apparatus, is continually parting with its heat, and the coldest particles in the volume of water at any given point of the apparatus will occupy the lowest place; consequently the coldest particles, throughout the length of the pipes, will rest on the inner surface of their under side, and as the inner surface of the under side of the flows descend in the direction of the top of the boiler, the coldest or heaviest particles of the water contained in them will roll or gravitate down the inclined plane, just as the coldest or heaviest particles did at the time of starting the fire under the boiler. On these grounds we say that a continuous rise in the flow-pipes is a hindrance rather than otherwise to the circulation of the water. Therefore, the flow-pipes of a properly adjusted hot-water apparatus should be carried to the highest point of action in the structures to be heated as soon after they leave the boiler as the general arrangements of the structures and the position of the boiler in relation thereto will admit, and from this point the pipes should gradually descend until they connect with the boiler again at its lowest point. Thus the heated water, when it leaves the boiler, cannot return when it becomes colder except by the legitimate route of travelling through the whole length of the pipes, and entering at the lowest point of action of the apparatus.

J. HAMMOND.

FORCING AND FUEL.

To the forcing gardener the past two months have been both heart and head aching, heartaching because of the heavy coal bill which, week after week, is running up, and then "per contra," the serious reflection, what is the result going to be? The probable result will be capable of close calculation by a few more weeks; early Grapes and Peaches to a certainty even now. But what will each Peach have cost, and what will be the paying price of each pound of Grapes? These are questions which weigh on the heart of many a gardener, for employers will often ask the pertinent question, What have the coals been burned for? These two months have also been headaching because of the heavy balance between a temperature of 60° in houses, and 20°, or even 10° out-doors, with sunless skies, and consequent etiolation of all active vegetation, anxieties of setting, and thinning, and thrips—anxieties by night and day.

Once on a time early Grapes, Peaches, or Strawberries from one's own hothouses in May was an achievement, a sort of triumph, a rare thing indeed, and he was a happy and successful man who accomplished the feat; the forcing of fruits was then the luxury of labour, an elegant pastime, and everybody was pleased because the garden was not pressed into the category of life's necessities. But in these latter days no gardener or employer dreams of forcing fruits or flowers merely for the pleasure of the thing, and ripe Grapes, Strawberries, or Peaches in March are no achievement at all; but the man who undertakes those duties and fails, is himself a failure, and a useless fellow. The gardener who wishes to make himself a reputation must do the impossible, or what is next to it. Early Grapes in January have long ago been achieved, now Strawberries all the year round seems rising above the practical horizon. The first pound of tea was a royal luxury, now it is the pauper's necessity of life. Franklin amused himself by fetching lightning from the clouds with a bit of wet cord, now lightning itself has become a necessity of our lives; we now amuse ourselves with "phones" of various sorts, as the great American did with his string, but by-and-by some enterprising firm will be turning the thunder into a necessity. Forcing-houses have apparently reached their climax, and must be superseded; they have served their day and purpose by bringing a coveted and vastly distant climate and its products to our doors, now the distance has been annihilated, we can easily go to the climate and fetch its products. Shall we continue to keep zoological gardens and botanic gardens, the necessity for which seems to be vanishing, or shall we spend our holidays among the beasts and plants in their native habitats?—it really seems as if it were coming to that. Already we are giving up the cultivation of the Pine-Apple, and really, with all those heaps of red-cheeked Baldwins and yellow Newtown Pippins in our street windows, we may economically give up our orchards. The bulk of

forced Grapes in the London market comes from the Channel Islands, where the heat of the sun is found to be cheaper than coal, which points the possibility of flooding our markets with the best Grapes from the south of France, and it only awaits an enterprising practical beginning to open the way, just as the American meat question has been solved. Who will say that we may not yet have ship-loads of American Peaches poured into our markets, like Bananas, or Mackerel from Kinsale, equally perishable? Till then, however, our forcing must go on, since it has descended to a matter of business, in the most economical manner possible. We have to consider first how coals are to be saved, and second, how to realise the greatest possible return. Now in the matter of economy of fuel, in these winter days, there will be something like fourteen hours of darkness, when the fire has all the duty to perform in the shape of keeping up temperature; during those fourteen hours the whole of the glass of the forcing-house may be covered with some protecting material, such as mats or canvas; as a little additional darkness is of no moment, this will conserve the indoor temperature enormously, and consequently economise fuel. In forcing-houses no more glass should be used in their construction than is absolutely necessary; and fronts and ends may sometimes be matted up permanently in winter with advantage. Economy of fuel is much in the hands of the stoker—he should be no sluggard in the morning; fires should be stirred long before sunrise, to anticipate and assist the coming light and sunshine; by day it will generally be sufficient, with no additional fuel, if by managing the furnace the heat is prevented from escaping by the chimney.

But great as is the importance of economising fuel, the best economy is, after all, a good and successful crop. Half a crop, or no crop, with only the trees to be kept in health for another essay, is a poor return for coals and labour. Given the subject to be forced, in good condition, the most essential matter is to drive cautiously. When one starts to drive a long journey, to get quickly and safely to the end of it the horse must not be put to his full speed at the beginning, neither must he be left to his own natural walking pace, but with a gentle control of the reins, keeping him well in hand, using the whip judiciously, and using up his remaining pace at the finish. The forcing of fruits are just something after the same analogy; if you wish to get there in April with your Grapes, begin the journey quietly in November—a month later will do for Peaches—but at all times, especially at beginning and mid journey, spare the energies of the trees, drive steadily, avoiding fits and starts and over-excitement,—it is the rock the inexperienced often split upon in the anxiety to get there. A weak horse will pull you through with careful driving; the strong may do the same, in spite of mismanagement, when the weak would break down at once. Again, let the load be no greater than your horse or tree can carry; overloading, or the last straw, breaks the camel's back.

It does not need to be forgotten that the real secret of successful forcing lies in the previous management of the trees or plants ; if the crop is not in them, no forcing, however cautiously managed, can fetch it out of them. This is, however, a matter for consideration when the forcing season has departed.

THE SQUIRE'S GARDENER.



HARDY FRUITS.

WHEREVER pruning has not been finished—and in many cases it was almost impossible to finish the work, as frost set in so early and was continuous—but for the sake of getting the trees finished, all kinds may now be cut to the necessary extent. Peaches and Nectarines are generally left to the end of the month, or March. Planting was cut short also by frost. We have at present some bundles of trees in soil by the roots, and protected with litter till ground is ready ; but we prefer waiting till ground is dry enough and warmed by the sun, should it come in time. In some forest-planting we have the same consideration as with fruit-trees. Pruning of Apples in orchards may be done as early as possible. In the great fruit districts, there are men who are called pruners, some of whom do their work well ; but too often the trees—all and sundry—receive the same amount of lopping. For Standards, open centres, and a total absence of crossing branches, are two important points : if all is right, there will be no dead wood to cut out. Where there is dead wood and canker, it is a true sign the roots are in bad soil, far from the surface. Lifting or getting these feeders out of the unhealthy soil is the only remedy. We would do it this season, late as it is, rather than have the evil increase by another season's delay. Dressing from the surface may be done with impunity : decoying the roots upwards to sun and air. All loose shoots, if such are to be found, should be cut in to form spurs. Cordons, whether on wires or along fences, simply require shortening back of the previous season's shoots ; when they are very fruitful they require little manipulation. Some of the best fruit we have seen have been on Cordons by the edges of walks and borders ; but "management" the whole season through has much to do with it. Bush-trees are easily managed. Cutting in as one would Currants, and keeping these dwarf trees about 4 feet high, and about 6 feet apart, is a very interesting sight ; and great quantities may often be taken off a small piece of ground. Such Liliputian growth is more to give interest to amateurs who wish to get a good knowledge of the kinds. Apples may be trained on fences or buildings, either horizontally or perpendicularly, as is generally done with red and white Currants when they are to be netted up. What applies to Apples is generally suitable to Pears. The latter are more

ready to form natural spurs, which are the best, and most likely to last longer than those cut in with the knife. The finer kinds of Pears are less hardy than Apples, and do little without the aid of a wall, except in the more southern districts. Training on walls is an operation which is attended with good results when well done, and the roots kept healthy and near the surface. All the training and knife-work possible will never make fruitful trees when the roots are allowed to go down—away from sun and air. The spurs growing out from the walls may be cut off, and those growing on each side of the branch should be left; and they should never be allowed to become crowded. In northern districts the spurs should have the full benefit of the wall. The difference we have noticed by the close system is very remarkable. On walls many systems of training may be practised with good results. Horizontal, or taking shoots at right angles, and each placed about two or three bricks wide, is the system which gives least labour, and looks very neat. Fan-training is simply extending the branches to a given distance formed as a fan. They start close to the main stem of the tree, gradually widening, so that at the extreme points they may stand a foot or more apart. We often have seen these shoots left a few inches apart; and the cultivators have wondered how they, year after year, show profusion of bloom, and never bear (scarcely) any fruit. The reply is simple enough: the fruit-buds are always so crowded by foliage up to late in the autumn, that they never ripen, and are consequently unprepared to fertilise their blossoms when they open. Let the roots of such trees have the influence of sun and air to form fibres, and every alternate branch cut out, and we have no fear of fruiting. We once had the charge of a splendid wall of trees, which were all loaded every year, many seasons running. They were got into fine shape and size by a skilful predecessor; and we lifted them piecemeal, mulched the surface with good manure, cut off long spurs, tied others close to the wall, and the result was a great change of fruit, both in appearance and quality. It is useless to suppose that attention to these items once is to be a permanent success. They must be examined yearly, and receive what is to keep them healthy and in bearing condition.

Plums, like Pears, can be trained in any form, but they are very often found fan-shaped; but seldom are these or any stone-fruits found well trained (even where they are in healthy bearing condition), but spread over the walls to cover the space without any proper system. We prefer laying them out similar to Pears, with leading shoots from the trunk to the full extent, with short side shoots and natural spurs from base to top. The centres are cut back to about half the length of the side shoots to give the necessary branches to fill up the whole tree; but it is long since we discontinued cutting back so closely. A tree when at its full size should bear fruit to the base—the two lower branches being horizontal, about a foot from the ground.

Pyramid Plums may be pruned and treated as Apples and Pears ; but as with all stone-fruits, they like very firm soil and plenty of lime or chalk in it. Pruning should be mostly done during the growing season : little should be left till winter ; but dead spurs and those coming out from the walls should be cut off, and old shoots getting past use should be replaced by young growths. Plums trained upright or horizontal form may be spurred like Pears, every season renewing some exhausted portion of the tree. Cherries are often liable to canker ; and they are the worst of trees to cure of the malady. They do not lift so easily ; it is best to watch them from their very early stages, working in lime-rubbish to the soil near the roots. They must be well cut back in their centres, as it is difficult to get wood to fill up a tree evenly. They may be managed easily on the close spur system. Standard Cherries bear abundantly in some localities, but it is often difficult to preserve the fruit from birds. In the Cherry orchards which supply London Market, powder and shot are freely used, and the "pickers" go over the trees, taking the fruit as they ripen. Cherries grown on walls are high-class fruits compared with Standards. Morello and Kentish Cherries should have extra firm soil, strong, and free from manure. They bear on the young wood formed the previous season ; cutting the shoots in to form spurs does not answer well : if natural spurs are formed they are fruitful. The wood should be short-jointed and firm, whether on Standard trees or those trained to walls and fences. It is a mistake to suppose that a north wall is essential for these. The best we have seen were on the front of a house among other buildings : they are, however, often very fine on north walls. Apricots are often fickle to deal with : as one expects them about their best they often die off piecemeal — sometimes the half of the tree at a time. When planting, the subsoil should be examined ; if it is cold and unhealthy, a layer of concrete should be placed over the soil under the roots, then a layer of brick and lime-rubbish. The trees in most situations should be planted high. When gross sappy growth is observed in the growing season, these should be topped as they grow ; lifting the roots in due time. The pruning may be performed as recommended for Plums. Peaches and Nectarines may remain untied till March, keeping the bearing-shoots from the walls—keeping these late has much to do with their success. All trees should be free from moss, American blight, scale, or any other insects : a washing with Gishurst compound, using a brush, may be necessary. Moss may be scraped off and the bark coated with lime. Trees about being planted should have wide holes, good loam, and proper mulching for the roots. Raspberries, Currants, and Gooseberries should be planted in deep, well-manured soil ; the first named in a cool position.

M. T.

CARNATIONS, PICOTEES, AND PINKS.

SOME months ago, a correspondent, a lover of these sweet plants, whose efforts at their cultivation had not been rewarded with desired success, asked me to write an article on their cultivation in 'The Gardener'; and as I find the subject has not lately been treated of in these pages, I the more readily accede to the request.

SOIL.—Perhaps the most important matter in the successful cultivation of these plants consists in having a properly prepared compost for growing them. The finest plants, yielding the most satisfactory crops of bloom I ever remember seeing, were grown in rather heavy turfy loam that was stored, but not required, for a vinery border. It was stacked in ridges, with one-fourth its own bulk of clean horse-droppings, and once, during frosty weather, thoroughly saturated with cow-urine. The soil on the sites of the intended beds (a heavy clay) was removed to the depth of $2\frac{1}{2}$ feet, and some lime-rubbish put in the bottom to secure thorough drainage; for although these plants thrive best in a cool, moist soil, stagnant water is very injurious to them. When the soil was placed in the beds, a very little leaf-mould was mixed with it, and the plants planted, 15 inches apart, about the end of March—and they did splendidly. I have also seen them do well on the same soil when the under layers of the clay were burnt and mixed with the best of the natural soil, with the addition of good, well-decayed stable-yard manure. In light soils it is advisable to procure some heavy soil for the purpose of giving it more body; for although the plants thrive tolerably well in light soil if in fair condition—more especially Pinks—yet a somewhat heavy soil gives flowers of greater size and substance.

After the plants have begun to throw up the flower-stems, they will require to be tied to neat stakes to prevent them from being blown over by wind when they are coming into flower; for when this happens, not only are the flowers spoilt, but the plants are injured into the bargain. If the blooms be wanted for exhibition, a little manure-water, given while the stems are running up, but withheld before the flowers open, will assist them greatly. If too strong, or if applied too late, it may cause the colours to "run." To produce the very finest blooms, remove all the flower-buds except the main ones. To insure the bloom opening regularly, it may be necessary to tie the calyx with a bit of matting, and to slit it with a thin sharp knife, when one side bursts before the other. Shading from the hot mid-day sun, and from dashing rain, will secure flowers in the greatest perfection for the greatest possible time.

PROPAGATION.—They are easily propagated by cuttings; but I prefer layers. If cuttings are taken, July, or early in August, is the proper time; and moist weather is to be preferred. The cuttings should be put in a shady place, in light soil, with a dash of sand in it, covered with a hand-glass, and properly attended to with water, so that they

are not allowed to shrivel. But cuttings never make so robust plants as layers ; and therefore layers are recommended. The way to layer them is to scrape away the soil to the depth of a couple of inches round the old plant, and to mix the displaced earth with some leaf-mould and a little sharp sand. Then select suitable shoots, strip the leaves from the part of the stem to be buried in the soil ; and then, with a sharp knife, enter the shoot half-an-inch below the joint which is intended to be the base of the new plant, and run it up right through the centre of the layer, an inch, or an inch and a half beyond it, removing the lower half-inch of the "tongue" just below the joint from which the roots most readily proceed. When all the shoots of a plant are thus prepared, fill in the little hollow with some of the prepared soil, and set the layers upright in it, fastening them in their places with hooked pegs, and then cover in with the remainder of the soil.

Watering in dry weather is necessary ; for if the weather prove very dry, no roots will be emitted. In October, these will require to be lifted and placed in some sheltered place, where a little protection can be given. In dry soils, I have often seen them keep at the bottom of a south wall, or under hand-glasses, very well ; but in heavy soils they are apt to rot off in such quarters, and slugs and snails often eat them up wholesale ; therefore I recommend that they be kept, during winter, in a cold frame. My practice has been to put 2 inches of rough stones, or clinkers from the furnaces, in the bottom of the frame, and over this 4 inches of ashes, placing 6 inches of light loam, mixed with some leaf-mould, and a little sand sprinkled over the surface ; and by this means they winter in good condition. A word of warning here to amateurs. The frame is only for keeping them dry. If they are kept close they will grow ; and the growth made during the dark days of winter cannot stand damp, frost, or even hot sun. So give air night and day at top and bottom in all weathers, never closing the frames unless the plants are safely frozen up ; and then the light may be put close down.

SEEDLINGS.—To those who have to supply large quantities of flowers, which are more appreciated when they are sweet smelling, I can strongly recommend seedlings. They flower much more profusely than the fine-named kinds, and are of very much greater strength. Seedling Carnations and Picotees flower on until the frost stops them ; and some of our old plants are of a size, and have yielded a supply of cut-flowers quite unapproached by the fine-named kinds. True, seedlings are not so good from a florist's point of view ; but if got from a good strain, they are equally useful for cut-blooms, and I think they are sweeter scented. At any rate, they do not require half so much trouble, either in growing or in wintering, and they are much better fitted for hundreds of gardeners who have often to grow, not the finest, but what will keep the supply equal to the demand. Seed can be sown during April in cold well aired frames, where the soil is heavy and slugs abound ; otherwise a sheltered border will do very well. When

large enough, they can be pricked out at suitable distances, and finally put into permanent quarters in August or September, or during March the following spring. If well grown, they will bloom well the first season, but much better the second, when they yield an enormous amount of bloom for cutting. The mixed herbaceous border is a good place for them ; and they will increase in size for some years if the soil be suitable.

A. H.



PREPARING FOR THE FLOWER-GARDEN.

No time should now be lost in making final arrangements as to the mode of planting the beds for the ensuing season. There is much forethought called for, even in the smallest system of flower-beds—probably more proportionately than in those of large extent. Of course, a “hit” in the method of planting may occasionally be made where no forethought is exercised ; but at the same time, it may be safely affirmed, that it requires much thought and mental digesting of the matter to be successful year after year in the planting of a series of beds and borders which shall at the same time present novelty over the arrangements of previous years, combined with an average degree of excellence in the arrangements. Having got the mode of planting arranged, the stock of bedding-plants should also be made note of just now, and in the case of any kinds likely to be short in numbers, immediate steps taken to work up a sufficient supply for the inevitable bedding-out season. I find an abundant stock of the various plants required at that particular season a most important factor in getting along with the work sweetly and expeditiously. A surplus margin of five to ten per cent of plants allows a sufficient number to come and go with in planting ; and with such an excess over the number required, it will be patent to any one that, with a previously-arranged plan, the entire system of beds can be filled in detail without a hitch occurring. Where there is, therefore, any likelihood of the stock of Lobelias, Iresines, Verbenas, and even Pelargoniums, or of other plants which can be propagated now, being deficient in number at the bedding-out season, a batch of cuttings ought to be struck without any delay. This is an easy enough matter where proper means can be had for the purpose ; but it too often occurs that the very slight accommodation required is as difficult to come at as if it were something calling for an extraordinary expenditure. At this season we find a bed of dung and leaves of very great value for various purposes ; but the bed is thoroughly protected from all influences which can abstract its heat or render its heating power nugatory. An exposed hotbed with frame for the

next six weeks requires the command of a very large supply of fresh material to keep it in a suitable condition for striking cuttings; whereas a bed introduced into a pit, if in the first place properly managed, continues a valuable aid for weeks without further additions. A batch of cuttings struck in such a "make-shift" propagating-pit will require, when "boxed-off," to be freely started into growth in the same medium before being drafted into the structures commonly at command for growing on bedding-plants. If properly managed, these early-struck plants yield a large supply of the very best cuttings later on. Verbenas, more especially, require to be treated well when struck thus early. If these are not grown on quickly in a strong root-medium, and a warm, airy medium atmospherically, so that a stubby, clean growth is induced, they will prove of little use for supplying cuttings. Above all points, make sure of a sound under-structure—plenty of roots. So with Pelargoniums; where the supply of these is likely to be insufficient, as only too probably they will be in many gardens this spring, a batch of cuttings should be immediately put in to strike. I use very small pots for these thus early—something like half an ounce of compost being sufficient for one pot. The compost used is half loam, half sand. The operation of inserting the cuttings is proceeded with very rapidly. A number of pots are placed side by side closely on the potting-bench; a spadeful of the compost is then shaken over them, sufficient in quantity to have each pot heaped up; the cuttings are then quickly inserted singly into the pots, pressing each in firmly with the two thumbs. The soil is kept moist; and when placed in a mild stove-temperature, roots are emitted in a comparatively short time. Our entire stock of young plants of Mrs Pollock—a favourite here—and Golden Chain, probably the best of yellow-leaved Pelargoniums, are propagated thus. Flowering kinds do equally well, provided they are not allowed to become pot-bound, but potted on into 4 or 5 inch pots, and encouraged to fill these with roots. These will flower just as freely as autumn-struck cuttings; but if there should be any fear on that score, the pots may be plunged deeply in the beds, so as to be counteractive of overmuch leaf-growth. In many ways the Geranium is pre-eminent amongst flowering bedding-plants: they are compact, massive, brilliant or soft, but always refined. Wherever Pelargoniums succeed, they ought to maintain a prominent position in the flower-garden, and all other flowering plants subordinated, as a rule, to them.

There are certain foliage plants of great value in particular positions which ought to be this month propagated from seed. In the case of all those just to be mentioned, an early start is a simple en-

cessity to secure plants of an effective size throughout the summer. The most graceful and generally useful of those foliage plants which may be annually raised from seed is *Acacia lophantha*, a species of that extensive genus sometimes used for decorative purposes indoors. It grows very rapidly planted out in good soil, and is hardy enough to stand autumn frosts. This, as also the other plants noted below, is raised in boxes, freely drained, as the young seedlings are not potted off until they have made a good start, the compost being open and rich. The seeds are steeped for several hours in hot water—long enough to soften the outer casing—and at the proper stage pressed thinly into the soil, just sufficiently deep to have the seed covered. The soil is kept moist; and further, to keep the surface in an equable condition in that respect, the boxes are covered with brown paper or moss until the seeds have germinated. A temperature of 60° is a very suitable one for starting the seeds in. When a few inches high, the seedlings are potted singly into 5-inch pots, and kept gently growing, and in due time, as the season advances, hardened off, and planted out with other stuff about the end of May. *Cannas* do well under the same treatment; but these have not proved satisfactory here, and are not now grown. *Wigandia caracasana*, when well grown, makes a handsome foliage plant. The seeds are very small. After the seedlings are up, they require growing on quickly to secure strong plants for the bedding-out season. *Solanum Warscewiczii* requires sowing just now too, though it is not necessary to push the young plants on so rapidly as the above. *Ricinus* (the best of which for Northern latitudes is *Africanus*), *Diacanthas*, *D. chamæpeuce* (being a very necessary plant), and variegated Maize, are soon enough sown eight weeks later. If a stock of the beautiful *Verbena venosa* is wanted from seed, it should be sown immediately in order to have good-sized plants. The seeds ought to be steeped in water before sowing, and a not over-high temperature indulged in.

There is no time better than the present month for getting hardy subjects into their respective places. There is generally a spell of fine weather in February, and advantage ought to be taken of it for the above purpose. The plants, either from cuttings or division, or cuttings inserted to strike where they are to remain, get established sufficiently before the drying winds of March come, and are also safe from the interested attentions of birds intent on setting up establishments for themselves later on in the season. *Cerastium tomentosum*, the dark-leaved *Ajuga reptans*, and *Stellaria graminea aurea*, are a trio of edging or carpeting plants of the first order. The first-named is propagated by division or cuttings; the *Ajuga* by division; whilst the *Stellaria*, which has got into bad repute through being improperly

treated, should be planted in good-sized tufts very closely. The various Sedums may be planted at any time either now or later on with equal success. Veronicas repens and pectinata, Saxifragas cæspitosa and pulchella, and other hardy carpeting-plants, should all be divided and planted now. An easily-managed grey-leaved plant, not commonly grown, but well worth looking after nevertheless, is Santolina incana. Slips of this, planted closely where it is to remain, should now be put in. The beautiful variegated Polemonium and Festuca glauca, both worthy of more extended cultivation, should now be divided and replanted. The form of Dactyllis glomerata known as elegantissima should be left undisturbed till April. A most attractive late-flowering plant which should now be divided is Sedum spectabile. Phloxes should also be put out now; as also such Carnations as Duke of Wellington, King of Purples, and Princess of Wales. Violas and Pansies ought to be sufficiently well rooted to stand transplanting now. I do not know whether I am singular in my experience of Violas, but the only really good bedding kinds here are Golden Perpetual, Sovereign, Grievei, Perfection, Alpha, and, from appearances, Duchess of Sutherland. No good white, free-blooming and continuous, has been yet secured. Those who would prefer a good bloom, from the florist point of view, with compact habit and continuity in flowering, will find an acquisition in King Koffee Pansy. A well-managed bed of fancy Pansies would prove a most interesting one in many gardens. Only tried free-blooming and distinct kinds, and therefore limited as to the number of sorts, would be admissible to such a position: probably Buttercup, Annette, True Blue, and Queen of the Gipsies would be a sufficient number. A bed of show varieties might be made up of the following sorts: King Koffee, Brilliant, Nina, Robert Burns, and Rev. A. D. Taylor. Provided the beds are gone over three times during the summer, and decayed blooms and seed-pods gathered off the plants, good cultivation being supposed as a necessity, a greater quantity of bloom will be secured from these than from the great majority of bedding Violas now cultivated. I may be allowed here to suggest a use for old Fuchsias which are inclined to get bare in the stem. Cut them over about 4 feet from the surface of the pot, train off all side shoots, and place in a warm structure, to start them into growth. Encourage about half-a-dozen shoots to push from near the top of the stem, and manage these so that a good large head may be formed early in the season. These standard Fuchsias will be found very useful planted widely in borders. Young plants may be quickly grown for the above purpose, but old plants of no value do equally well.

R. P. B.

NOTES ON DECORATIVE GREENHOUSE-PLANTS.

THE CAPE HEATH.

EQUAL in importance to the Azalea, as a decorative plant, we must reckon the Cape Heath; and perhaps first in importance as regards details of culture. Indeed, to produce a healthy well-flowered specimen Heath, especially one of the hard-wooded varieties, may be almost considered a test-point in plant culture. And very few cultivators indeed can produce good specimens of any considerable size, and keep them in health for a number of years. In order to succeed in the cultivation of Heaths, a man's care and watchfulness must be continuous, and not spasmodic, as no plant will sooner testify to neglect or carelessness in watering or other details of management; and when once the damage is done, no after-treatment can rectify it.

If possible, this genus of plants should be under the care of one man about a place; and in whatever house the plants may be placed, he should still have the care of them, and no one else be allowed to touch them. He will thus get to know the wants of each plant, and can administer to them as required. Great damage is frequently done to plants through being handed from one man's charge into that of another, as they may be changed from house to house. A man thus loses interest in the plants; and they are very likely to suffer from being either over-watered or under-watered, unless the man should be extra careful, which, we are sorry to add, is frequently not the case. Of course, to small or moderate-sized places these remarks do not apply, as in such places the whole of the glass will probably be under the master's care, or under the charge of one man; and it is oftenest from such places that we see really good plants of all kinds turned out—not to speak of other branches of gardening, which goes to prove the correctness of our remarks. We are of opinion that in large places especially, instead of having a man to take charge of a certain number of houses, whatever may be their contents, or however often changed, it would be a far better plan to let the man have the charge of certain kinds of plants wherever they may be placed, either temporarily or otherwise. If that were the case, we do not think so many dead-alive-looking plants would be seen as one does find in going through many places. A man would come to take a pride in seeing the things under his care doing well, knowing that if anything went wrong with them it would be known where the blame lay.

Unless in the raising of new varieties from seed, Heaths are propagated from cuttings. The young growths, after they have got a little firmness in them, should be slipped off with a heel, trimmed with a

sharp knife, and the foliage clipped or cut from off a portion of the lower end of the stem. Six-inch pots are large enough in which to place the cuttings. Fill the pots, after crocking them well, to within an inch or so of the rim, with good peat, rubbed through a half-inch riddle, using some of the rougher portions on the top of the crocks, so as to secure thorough drainage—some silver-sand may be mixed along with the peat—press all firmly into the pots, and smooth it off level, then fill up with pure silver-sand, water through a fine rose, and then the pots are ready for the cuttings. Take a bell-glass a size smaller than the pots, and press it on the sand so as to make a mark, then proceed to put in the cuttings within this mark, so that they may be clear of the glass when it is put over them. Put the cuttings in firmly, and give another watering through a fine rose, to settle the sand about them; and after the cuttings have dried a little, put on the bell-glasses. They may be placed in a house having a temperature of about 50°, and shaded from bright sun. The glass should be taken off and wiped dry inside every morning; and they must be watched for mildew, and dusted slightly with sulphur on its first appearance. After they have formed roots, pot them off singly into small thumb-pots, using nearly equal parts of peat, rubbed through a fine sieve, and silver-sand; and, indeed, in all subsequent stages of their culture, nothing but good fibry peat and silver-sand should be used; only, as the pots increase in size, the compost should be rougher, so that when they come to be in pots larger than 6 inches, the soil should merely be broken in pieces with the hands, and not sifted at all; and at this stage a few small pieces of charcoal will be an advantage in helping to keep the soil open. The pots should always be carefully drained, not so much by putting in a large quantity of crocks thrown in any how, as in having them carefully put in, and a layer of sphagnum moss over them.

The great object during the first three or four years of their growth is to get a good foundation laid for the future specimen plant; this must be secured by frequent pinchings, and tying out the young shoots so as to get them into proper form. If this is not properly attended to at first it can never be done afterwards. They should never be shifted into larger pots until the ball is thoroughly permeated with the roots. On the other hand, they should not, in a young stage, be allowed to become pot-bound. The shifting is always a critical time with them; and many plants give way at this time or soon after, which shows the necessity of carefulness in the operation. The soil should be in a nice state as regards moistness, not too dry, nor yet wet enough to be sticky. After they are shifted, give a good watering, frequently repeated, until the whole mass is soaked through,

and be careful that the ball is not dry before shifting ; if so, you will never manage to get it wet again by ordinary waterings ; the only plan is to steep it for an hour or two in a pail or cistern of water, and then let it drip awhile before potting. In potting, the soil must be rammed hard round about the ball. After they are watered as above they will not require any more waterings for a considerable time. They should be set in a shaded place after potting, and out of draughts, and may get a dewing over with a syringe on the evenings of hot days. As regards training, a certain number of stakes are absolutely necessary for most varieties ; yet they could do with far fewer stakes than are often used in the training. Sometimes they are used in such numbers as to be quite unsightly. The best way is to place a row of short stakes inside the rim of the pot, and leaning outwards over it ; then within this again another row, a little more upright ; a third row, almost upright, with an upright one in the centre, will be sufficient for the largest plants. The stakes should all be set before any tying is done, and cut over to the proper height—all the stakes forming each row being of equal length ; then the main branches can be tied to the stakes, or slung to each other, as may be most convenient for bringing the plant into due form.

Mildew is the chief enemy Heaths have to contend against, and sulphur dusted on them is the best antidote for it. This, with careful watering and potting, constitutes the whole secret of success in the culture of Cape Heaths. Subjoined is a list of eighteen of the best varieties:—*Austiniana*, *Cavendishiana*, *Eximea superba*, *Hendersonii*, *Intermedia*, *Irbyana*, *Jasminoides alba*, *Lambertiana*, *Marnockiana*, *Massonii major*, *M'Nabiana*, *Obbata*, *Perspicua nana*, *Retorta major*, *Tricolor elegans*, *Ventricosa Bothwelliana*, *Ventricosa globosa*, *Ventricosa tricolor*, and *Hyemalis*, autumn and spring *Gracilis*, and *Melantheræ* for cutting from.

J. G. W.



GARDENING IN THE OPEN.

I WAS much pleased to see both the Editor and the "Squire's Gardener" advocating the system of planting fruit-trees generally in plots of ground specially set apart for them, rather than of following the old and decidedly wrong system of mixing fruit-trees and vegetables. The gardens here are entirely surrounded by Apple, Pear, Cherry, and Plum trees ; and there is also a considerable number dotted about the garden. The result, more especially with regard to Apples, is, that a few good orchard-trees grow more fruit than the whole of our over-pruned and, of necessity, much abused specimens.

In this district there are large fruit-gardens or orchards, and all the farmers annually devote many acres to the growth of the most common vegetables for market. What at first sight appears unaccountable to many, is the fact that Peas sown by them at the same time as we sow in private gardens (for experiment I have tried the same varieties), are always fully a fortnight earlier than ours, and of a much better quality. It is the same with Potatoes, Runner and Kidney Beans, &c.; and acres of Strawberries are picked long before ours, and of a size and quality, too, so surpassingly good, both then and later on, that we usually go to the fields for them whenever any extra good ones are required. In how many gardens is the Alice Maud Strawberry to be found? Very few, I opine, because of its bad quality; and yet this is grown in large quantities for the early supply. This is followed by British Queen; and this again by another variety not so frequently grown as it deserves to be—Eleanor or the Oxonian. All three varieties at fruiting-time present a sight very rarely indeed to be met with in private gardens. Another curious fact is, that the earliest and best vegetables and fruit are invariably found in the centre of the field. That is a strong proof that growing them under the shelter of walls, hedges, &c., is, if not altogether a mistake, far from being either necessary or advisable, as it has the effect of stimulating the growth at unseasonable times, on which the first unfavourable change quickly has a very injurious effect. Those in the open grow sturdy and strong, and consequently are better able to withstand inclement weather, both with regard to the growth, but more especially the bloom; and what is undoubtedly of primary importance, they obtain the most bountiful supply of light and air.

Between here and London, I very frequently see hundreds of acres of the most sturdy Cabbages, Brussels Sprouts, Celery, Onions, and, very noticeably, Lettuce. One would think any gardener who has seen the latter growing in the open, would in the future give this most useful vegetable a fair chance. Yet this is not the case; the majority apparently thinking the proper place for it is among the fruit-trees, and other out-of-the-way spots, rarely grow any really good Lettuce. Brown Cos Lettuce is never grown for market, on account of its objectionable colour; but the varieties of Green Cos appear hardy enough, having this season withstood twenty or more degrees of frost, and will no doubt eventually be fit for use before those wintered by gardeners in frames. Vegetable Marrows and Cucumbers, again, are largely grown in the open fields, and the crops are usually enormous. It is true they are manured heavily, and early in the season are sheltered by lines of Rye-grass sown for that purpose; but contrast them and their

treatment with those in private gardens, where they are very often grown on heaps of rubbish or manure, growing luxuriantly and fruiting but little. The above facts will, I trust, help to demonstrate the correctness of the theory propounded by the above-mentioned writers; and I for one will, if it can be avoided, never attempt to grow fruit-trees and vegetables together—nor, after seeing the many healthy Standard trees heavily laden with fruit in the vicinity of London, go in for any Pyramids, which, however shapely and well managed, are seldom profitable. I think the Editor would have done well to have mentioned the few varieties of Apples he finds so useful in his district, as it is not yet too late to plant. Here the market-growers confine themselves to a very few varieties—the majority being kitchen-Apples, as one of the first questions usually addressed to the salesman by the buyers is, “Will they cook?” To the growers, the other essentials are size, colour, and productiveness. One of the best is Blenheim Orange; other favourites are Bess Pool, Wellington, Hawthornden, Hollandbury, Reinette de Canada, Warner’s King, King of the Pippins, and Hanwell Sowing.

W. IGGULDEN.

ORSETT HALL, ESSEX.

[The varieties we referred to are: Lord Suffield, Stirling Castle, Round Cat’s Head, King of the Pippins, Blenheim Pippin, Croftanry, New Hawthornden, Reinette de Canada, George the Fourth.—ED.]



NOTES FROM THE PAPERS.

THE ‘Garden,’ speaking of the culture of that most beautiful and deservedly popular flower the Bouvardia, in the London market gardens, says:—

“Messrs Low & Co., of Clapton, are the largest cultivators of Bouvardias in pots, and the way in which they grow them is as follows: In autumn old plants which have done flowering are cut down nearly close to the pot, and placed in a moderately cool dry temperature. After Christmas is over a little more heat is given them, and they are frequently syringed overhead; this has the effect of starting into growth a number of shoots from the bases of the plants. These, when sufficiently firm, are taken off, made into cuttings, inserted singly in 3-inch pots, and plunged in Cocoa-nut fibre on a gentle bottom-heat. These cuttings, under favourable circumstances, soon strike root, when they are potted in 5-inch and 6-inch pots in good fibrous loam and leaf-mould or rotten manure. As they advance in growth they are subjected to a cooler and more airy temperature than that in which they were struck, and when well established all the light, air, and sunshine possible are admitted to them, and they receive copious supplies of water at their roots. From these plants cuttings are taken with which to form a successional batch of plants; they are taken off when the plants have made three or four leaves, the two lower joints only being left on the plants. From these joints strong shoots are soon emitted; these, when 4 or 5 inches long, are also stopped; and this operation is

carried on in the same manner for four or five times, each set of cuttings being treated in the same way. Those struck first in the year make excellent bushy-flowering plants by the following autumn, and the last taken off, which is in August and September, make good plants to bloom in the succeeding spring. The old plants, from which the cuttings were first taken, are also shaken out and potted, and they make bushy, well-flowered plants early in the summer. In order to make large specimens, which, however, is seldom done in market gardens (except for supplying cut blooms), old plants are cut back year after year and shaken out and repotted. During summer *Bouvardias* are grown in cool houses or pits, and sometimes in temporary frames, but in autumn, winter, and spring a moist airy temperature of from 50° to 55° is maintained, excepting in severe weather, when a little lower temperature does not injure them. During late years some growers plant out their *Bouvardias* in the open air in summer, a plan by which good plants may be obtained with less labour and expense than in the case of those grown in pots. It however becomes a question whether they are so valuable to the buyer as well-established pot-plants; but that, with growers for market, stands for nothing. For planting out, cuttings are inserted early in February, stopped in the same way as before mentioned, and, after being duly hardened off, are planted out about 2 feet apart in well-prepared ground the first week in June. During summer they are kept well supplied with manure-water, the surface-soil is kept well stirred with the hoe, and sometimes a mulching of manure is applied. In the first week of September, when the shoots show bloom, the plants are carefully lifted and potted, and, after being well watered overhead and at the roots, are placed in cold frames, and kept close and shaded until re-established; after that they are again exposed to air and sunshine, and when the weather gets cold they are placed in houses or warm pits near the glass. By this means strong, bushy, well-flowered specimens are obtained during the winter months which need no staking or support in any way. Indeed, under no circumstances do market-growers stake *Bouvardias*, beyond placing a neat deal stick in the centre of each plant, so as to support the branches in a manner to form neat, but by no means formal, conical or pyramidal-shaped plants."

"The Journal of Horticulture" gives, in the interests of seedsmen and their assistants, a piece of good advice on the subject of ordering seeds, which is well worth the attention of gardeners who delay sending their seed orders till the last moment, and then expect them to be executed at once. Says your contemporary:—

"Of the many thousands who purchase seeds few can form any conception of the extraordinary pressure that large firms experience during the busy season. It is only by long preparation and extreme effort; by close—too close—work, almost night and day, that orders can be executed in time to enable the seeds to be of service to the purchasers. By ordering seeds early no more cost is incurred by the purchaser, he has the choice of the first and usually the best stocks of seed, and a great boon is at the same time conferred on seed dealers and their assistants.

"During the height of the seed season it is absolutely impossible that orders can be executed immediately they are received, and consequently those who do not give the orders before the time for sowing arrives must experience considerable inconvenience. The seedsman is then generally blamed for a want of promptitude, when in reality the blame rests with the purchaser and not with the vendor. In order to facilitate the execution of orders, which become unusually heavy as the spring advances, the great seed firms commence pre-

parations in midwinter, and even before Christmas additional assistants are engaged, and men 'work overtime' in preparing packets and parcels of the seeds most likely to be in demand. Thus, everything that the vendors can do is done to accelerate the dispatch of the parcels with the utmost celerity. Could the seed-purchasing public see the efforts that are made to execute the orders with as little delay as possible, and hundreds of men working at high pressure until almost midnight for weeks together, they would endeavour to make out their orders early; they would then be better served, an important industrial section of the community would be benefited, and the wheels of an important trade would move the more smoothly."

In the same paper the genial 'Wiltshire Rector,' in his annual homily, has an interesting and true story to tell of gardeners who have actually as a colony gone on, fathers succeeded by sons, from A.D. 1422 to this very year—that is, for 456 years, and in the same place. It is in France, the land of fruit culture. There is a Scottish colony of gardeners at St Martin d'Auxigny near Bourges. Its history is this: "When Charles VII. of France was in retirement at Bourges he had a Scottish guard, whose High Constable was John Stuart of Darnley. In 1422 this gentleman established himself with his companions-in-arms at St Martin's. Special privileges were granted to the settlers until the revolution of 1789. The colony now numbers three thousand inhabitants; and the people, thus in some degree isolated, have maintained their nationality to the present day, the members marrying among themselves. Even now the people of the surrounding district call them 'the English,' but they call themselves 'the Scotch.' They have a strong regard for the country of their forefathers; they are Protestants in religion, and are very industrious and honest. They devote themselves, as they have always done since their settlement as a colony, to the culture of fruit. Each male possesses a small plot of ground, and the produce is sent to Bourges, Orleans, and Paris. Who knows but these interesting people had Scotch gardeners for their remote ancestors, and when they dropped soldiering resumed gardening."

Who killed the Culford Grape-Vine sport? Did it perish for want of gemmules in its system? or has it been laughed out of existence? Will Mr D. T. Fish sing its requiem? Will the 'Gardener's Chronicle' come out with a black border? Dejection reigns in Wellington Street, and there is gloom around Bury St Edmunds!

Ye still may see the Culford Vines
In summer when they're green,
But Culford's Golden Champion "sport"
Will never more be seen.

Alas! we are afraid it is 'The Gardener' and Mr William Thomson that have slain the "sport." But for this journal the Culford apparition would, without doubt, have been "chronicled" as a fact—if an unexplained and unaccountable one. It would have gone forth to the world as a reality, and backed by "scientific" authority that did not hesitate to set reasonable evidence and probabilities aside, to make room for mere assertions that were confessedly opposed to the best ascertained facts of vegetable physiology bearing on the case. Individuals may occasionally be excused for declining to be "convinced against their will," but what are we to think of the professedly philosophical exponent of the truth so far forgetting itself as to descend to such a position, and lend its influence to support a phenomenon that, to say the least, cannot stand to be tested fully and fairly by the common rules of evidence. Yes! it was 'The Gardener' that all but thrashed the life out of the

"sport," and took the wind out of the sails of its advocates, and with such effect too that they have not yet recovered from the shock—he who runs may read—and now Mr William Thomson has given the finishing stroke. The eyes which Mr Grieve sent to him to grow, that he might be not faithless but believing, have turned out as those who did not believe in the "sport" expected, and contrary to what its advocates wished; hence the object of the latter is now to explain Mr Thomson's evidence in another way. But what is most heartily amusing in the aspect of the "sport" question now, is the repudiation by those who have written in favour of it of the term "advocates of the sport"—among whom, if the term be allowed, one would naturally name Mr D. T. Fish as leading counsel. He it was who went over to Culford to elucidate the matter; he it was who propounded the gemmule theory; and he it was who generally took the "sport" under his care. But he was no "advocate of the sport." Oh, dear, no! There was nothing in all he said and did as its champion that savoured of such a thing—nothing whatever. All he had got to do was simply to record what he saw, and he did not venture a word more. He did not come forward as the advocate of the "sport," because his old friend of twenty years' standing besought him to do so. He did not see a bunch of Grapes growing from a Trebbiano shoot and call it a Golden Champion as his friend did, nor did he, when he found that the "sport" conformed to no recognised law of growth or production, put forward the gemmule hypothesis for the occasion, and make as much of it as an advocate could do who had a bad case, and only one strike to his bow. Neither did he, with the 'cute tactics of the advocate, maintain that the failure of the Vine eyes to grow, which Mr Grieve planted, was proof of the *bona fide* character of the "sport;" nor in anticipation of probable results did he insinuate that if the eyes sent to Mr Thomson *did grow*, they might "hie back again," and prove the same thing or nothing at all! He did not make use of Darwin, nor invoke his own remarkable experiences concerning "striking instances of variation from normal types" to establish his case; nor did he supplement his vision and only guide in the matter by one single speculation on the subject. No; these are not the tactics of the advocate, and Mr Fish did none of these things. No one would think of accusing him of being an advocate of anything—even of the "limekiln."

What happened to Mr Worthington G. Smith when he visited Edinburgh? Can anybody tell us? Here is that accurate observer's description of the capital of the north, and what he saw there:—

"When a traveller finds himself in a magnificent city, with stone houses eight and nine storeys high, and where 'haggis' is sold in the provision shops, and where 'tripe,' 'hot tripe,' 'hot tripe suppers,' meets him printed at every turn, where, in the ancient and venerable and archæological slums he sees, 'porridge at 8' painted on privileged-gates, and where hardy northmen, emerging from 'wynds' and 'closes,' throw glasses of 'usquebaugh' down their throats without the glass touching or nearing their lips, then he may feel sure he is in Edinburgh."

Is it possible that some wag directed Mr W. G. Smith, on his arrival, away from Princes Street and the New Town into the "wynds" and "closes" about the High Street, and left him there like the "mitherless bairn,"

"Wha stan's last and lanely, and naebody carin'."

Mr W. G. Smith would no doubt soon see a haggis where he found himself. A few turns would take him into the "Coogate," where he would see the

"magnificent city with stone houses eight and nine storeys high." Another turn or two would lead him to the slums and closes about the "Old Flesh-market," where he would find the "tripe," and a little further on in St Mary's Wynd he would see the natives swallowing the whisky "without the glass touching or nearing their lips," where he seems to have brought his visit to a close, and gone south again to write for the 'Chronicle' "A true and particular account of Mr Worthington G. Smith's visit to Edinburgh and the north, and all he saw there." It is distressing to learn that on the great subject of "Puddock Stools," Edinburgh and the north is still under a cloud, and on the whole we fear the haggis, the tripe, the whisky, the porridge, combined with the air of the north generally, have been too much for the advocate of a toad-stool diet and discoverer of the "resting-spore," who may have felt just a little out of his latitude, and may be just a trifle neglected as well. Porridge and whisky are good stiffeners of the spinal column, which, north of the Tweed, supports a head that needs a hat a size larger than usual—hence, probably, it is that the "salus" and the "resting-spore" are at a discount there, and that in Mr W. G. Smith's mind the Modern Athens is associated only with tripe, haggis, porridge, and whisky.

"Little Dips in Lethe," by Shirley Hibberd, is the title of an article in the last Christmas Number of the 'Gardener's Magazine.' What is "Lethe," does the reader ask? Well, being inexperienced, we would rather reserve our opinion as to the nature of the compound in which Mr Shirley Hibberd "dipped" more than once as he tells us; but Mr Hibberd himself confesses that "he felt as if he had taken Scotch whisky." He was conscious of that "agreeable state of warmth and lightness" which the "whisky" imparts, and we may be sure Mr Shirley Hibberd knows what he is talking about. After one of his "dips,"* he says, "I now felt that madness had really come upon me, and I began to bathe my temples and drink soda-water"—a cure, it may be here mentioned, which has also been occasionally used successfully in cases of madness produced by other stimulants than "Lethe." But these were not the only experiences of Mr S. Hibberd while under the influence of "Lethe." He continues—"For a moment I paused, considering, and then the parietal bones of my head expanded widely, as if parting at the sutures, and again collapsed with a sort of shuffling sound,"—a statement we do not doubt for a single moment. This tendency of his head to expand seemed so great on one occasion that it (his head) appeared "to fill the room." And he further states that he went to bed while under the influence of the drug, and his "head swelled to awful dimensions;" "but," he continues, "I was really asleep, and never could call to mind at what time I went to bed, or at what point of the illusion sleep came over me." Instances will no doubt occur to the reader of people who have been similarly affected at times. Going to bed and forgetting afterwards as to how and when that event happened is a not uncommon experience to some people. Could it be at one of these periods of abnormal expansion that Mr Shirley Hibberd evolved the great idea of "pulley-trained fruit trees?" And was that famous lecture which he delivered before the R. S. A. conceived under a similar inspiration? It is exceedingly desirable that we should know this, because there are many horticultural and other writers "with hard-bound brains," who would be benefited by a little "expansion" of their top storey. Altogether we regard "Little Dips in Lethe" as one of the most suggestive contributions to the literature of the 'Gardener's Magazine' that has yet appeared in its pages.

READER.

* Query "nips."—*Printers' Devil*.

THE CYCLAMEN.

THE Cyclamen is fast rising to the front ranks as a decorative plant. This is not to be wondered at ; for where cut flowers are in demand, where rooms have to be decorated with flowering plants, and conservatories kept gay through the winter and spring months, there is no plant that will adapt itself better to the purpose than the Cyclamen. Cut flowers of it last a long time, and plants of it in a light position in rooms continue to throw up their flowers, and keep in good condition a considerable length of time. If the cultivator is in possession of a good strain of plants, the best system is to save seed from them, which will be ripe about July or August, when it should at once be sown. Some growers prefer sowing the seed in February and March ; and if the seed is not home-saved, and has to be purchased, it frequently, when old, is a long time before it germinates ; and if not sown till February, half the season is gone before the seedlings are up. If home-saved seed be sown when ripe, it germinates quickly, and allows a long season of growth.

The seed should be sown in pans in a light rich compost, not covering too deeply. When well watered, the pan should be covered with a sheet of glass, and moss laid over the glass. It soon germinates if placed in a temperature of 60°. As soon as the plants appear they should be gradually exposed to the light near the glass ; and if kept in the temperature named, they soon form small bulbs, leaf after leaf springs up, and in a very short time the seedlings are ready to be pricked off into other pans, which are preferable to small pots, pans not being so liable to get dry.

The Cyclamen should never be allowed to suffer for want of water during the season of active growth. When the young plants are large enough, they should be taken out of the pans and put into 3-inch pots, in a compost of rich fibry-loam, a little cow-manure, and sufficient sand to make the whole porous. When the plants have taken well to the new soil, they will grow rapidly ; and every care must be exercised that they receive no check. When the pots are full of roots, the plants should be repotted into 4-inch pots, using the same compost. The plants should be gradually hardened off from the temperature they have been growing in, and placed in cold frames ; and on all favourable occasions they should have abundance of air while making their growth, the frames being closed, and the plants dewed overhead with the syringe on fine afternoons. They should continue to grow apace, until they are ready for their final shift into 5 or 6 inch pots—although the size of pot should be determined by the cultivator, according to the different purposes the plants are re-

quired for. By the end of September or October they should be removed from the cold frames to a house where a little warmth is maintained and abundance of air can play amongst them. They should be placed as near to the glass as possible. They will soon commence to throw up their flowers, especially if placed into a little more warmth. By so doing, the plants can be brought into flower in batches as required.

Single bulbs treated as described will produce 100 to 150 blooms. These will not all be open at one time, but will be produced in succession for three months or more, provided they are not kept in too much heat. It is well to raise a set of young plants annually.

After blooming, the plants are carefully attended to, and are occasionally watered with manure-water, to assist them to develop and mature their bulbs thoroughly before they go to rest. Planting the bulbs out in the early part of June is a good system, mulching with cocoa-nut fibre or old tan, to prevent the ground from drying too frequently. Another good plan is to plunge the plants out in their pots in any material that will hold moisture. In either case the plants should be repotted in the early part of September, and kept close in a frame for a time, and there treated as described for the seedlings. The bulbs must be cared for after the flowering season, if success is again looked for.

A GROWER.



THE AMATEUR'S GARDEN.

SEEDS AND SEED-SOWING.

It is scarcely time yet (February) for getting in the general ruck of garden seeds, though in dry warm soil many kinds may be sown, at least by the end of the month, with great propriety. Now is the time to calculate and procure the quantities to be sown. Indeed, this should be seen to before the soil is prepared, so that ground intended for the various crops may be properly treated. In giving directions for choosing seeds, the general rule is to say how much of this, that, and the other thing will be required for a quarter of an acre, half an acre, and so on. Such advice only serves to puzzle. The fact is, no two individuals' wants are the same, and hence a selection of seeds which might fit one person very well would be of little use for another. What I propose is, to give as near the amount of space required by a given quantity of seed, and by this means each person will be enabled to calculate to a nicety the seed required for his own individual wants.

Beet—1 oz. will sow a row 50 feet long.

Broad Beans—1 lb. will sow a row 60 feet long.

French Beans—1½ lb. will sow 60 feet.

Carrots—1 oz. will sow 130 feet.

Cress—1 oz. will sow 20 feet of a row 4 inches broad.

Leeks—1 oz. will sow a bed 5 feet by 5 feet.

Lettuce— $\frac{1}{4}$ oz. will sow 50 feet.

Mustard—Same as Cress.

Onion—1 oz. will sow 40 feet.

Parsley—1 oz. will sow 50 feet.

Peas—1 lb. will sow 30 feet of a drill 5 inches broad, of the small, and 36 feet of the large sorts.

Parsnips—1 oz. will sow 100 feet.

Potatoes—1 peck will plant 100 feet if the seed is good, and cut to 2 eyes to a set only.

Radish—1 oz. will sow 20 feet.

Spinach—1 oz. will sow 60 feet.

Turnip—1 oz. will sow 100 feet.

Cabbage, Cauliflowers, Savoy, and all the Brassicas should be got in packets, as a very small quantity of seed will raise enough for most gardens cultivated by amateurs. Indeed, it is advisable to get the *plants* from the nursery or from some obliging friend, and so save a great amount of worry.

In some collections of seeds offered by enterprising seedsmen, I have sometimes seen 3 oz. of *Cabbage* included for gardens of $\frac{1}{4}$ of an acre! Why, it is more than enough to raise plants for the whole ground; of Celery and all other vegetables not included above, a moderate packet is sufficient. A mere pinch of Celery will raise hundreds of plants.

Concerning annual flower-seeds, some of the best got-up seedsmen's catalogues afford a good deal of information; and to these I must refer the amateur in the meantime, until I treat of them in a chapter on flower-gardening.

KINDS TO SOW.—It is not enough for the inexperienced to know the proper quantity of seed required to sow a given space, it is of greater importance to know *what* kinds to sow. The kinds named below have been fully proved by the writer of this, and he can therefore recommend them. Almost every variety recommended has been well proved, and I have carefully avoided anything savouring of novelty which has not been found equal or superior to older varieties. The inexperienced should not be led astray by the glowing accounts of new introductions, as a great percentage of really new vegetables are inferior to well-known kinds, and the really good are sometimes nothing more than old kinds re-named. At the same time, really meritorious novelties are occasionally introduced. In this selection, I range the names according to their earliness.

Beet—Dell's Dark Red, Nutting's Selected; and for extremely thin poor soils, Egyptian Turnip, rooted.

Broad Beans—Early Mazagan, Seville Longpod, Broad Windsor.

French Beans—Negro Longpod, Canadian Wonder.

Brussels Sprouts—All depends on the strain; Greens or Borecole, ditto.

Brocoli—Veitch's Autumn, Snow's Winter White, Purple Sprouting, White Sprouting, Leamington, Elletson's Mammoth, Dilcock's Bride.

Cauliflower—Early London, Dwarf Mammoth, Walcheren, Veitch's Autumn.

Carrots—Sutton's Champion Short Horn, James's Intermediate, Altringham—the Short Horn for earliest, and the Intermediate for shallow, soils.

Cabbage—Little Pixie, small, but of the finest quality; and if planted close, will yield *more* for the table than the large-growing kinds, many of which I consider unfit for the table at all. Dwarf York, fine for sowing in April to keep up an autumn supply: sown at the end of July, and planted out in September, it is fit for use in April and May. The same may be said of

Little Pixie. Enfield Market and Sugar-Loaf are good larger sorts. The Drumhead kinds are unfit for a small garden—the “dwarf” being of better quality than the “giant.”

Savoy—Sutton's Tom Thumb, very small, but of superexcellent quality; and if planted a foot apart each way, will yield almost as much as the larger kinds. Early Dwarf Ulm is a good early sort; and Drumhead a larger and later one.

Celery—Sandringham and Cole's Crystal among whites; Sutton's Sulham prize of pink varieties; and William's Matchless among reds.

Vegetable Marrow—Moore's Cream, and Hibberd's Prolific.

Leeks—Ayton Castle Giant for quality and size, and Musselburgh for hardness.

Lettuce—Cos varieties—London White and Paris White, Champion Brown.

Cabbage—Varieties—All-the-year-round and Neapolitan.

Onion—The Queen, very early, Danver's Yellow, Blood Red, James's Keeping, for spring sowing; and Globe, Flat Tripoli, and Giant Rocca for sowing early in August.

Peas—Ringleader, Kentish Invicta, William the First, and Sutton's Emerald Gem for first sowings; Dickson's Favourite, Daniel O'Rourke, and Fabus Market Favourite for second; best of all, M'Lean's Wonderful; Champion of England (very tall) for third sowing; Veitch's Perfection, Ne Plus Ultra, Lynn's Marrow, William's Emperor of the Marrows, Hair's Dwarf Mammoth, and M'Lean's Premier for last sowings.

Potatoes—Veitch's Early Ashleaf, Wonderful Red, Alpha, Early Rose, Snowflake, Dalmahoy, Walker's Early Regent, Paterson's Victoria, Sutton's Magnum Bonum. I strongly recommend beginners to fight shy of the more famous show kinds, as not a few are of very inferior quality, such, for instance, as the old Handsworth's Early, very wrongly re-christened Porter's Excelsior. This is an inferior Potato to eat, although of fine shape.

Radish—We advise amateurs to get their seed in mixed packets.

Parsnip—Student, Hollow Crowned.

Spinach—Round, for sowing in spring and summer; Prickly, for sowing about the middle of August. New Zealand requires to be raised under glass, and transplanted early in June.

Tomato—The Conqueror, and Hathaway's Excelsior. They require rearing under glass, and after danger from frost is past, to be put in any vacant space of a warm wall. In cold districts they require to be under glass.

Turnip—Early Dutch White, Early White Strap Leaf, Robertson's Golden Ball, Chirk Castle, Black Stone, and Laing's Swedish, for keeping over winter.

These varieties have always given satisfaction. It would have been very easy to have doubled or even trebled the list. Few amateurs require a long list, and more experienced growers will be able to add to this list for themselves. Sometimes a given variety of a vegetable will do well in one district and not in another, such as Peas and Potatoes. I would warn amateurs against being led astray by large vegetables—that is, kinds which grow large naturally, as the more rapidly the majority of vegetables are grown the tenderer they are. Half-starved garden produce is neither palatable nor wholesome; nor, as a rule, are giant varieties. Size and coarseness almost invariably go hand in hand; and as a matter of fact, it is not often that great, coarse-growing vegetables yield the greatest amount of real useful produce. For instance, the ground occupied with a coarse Drumhead Cabbage would produce three or four Little Pixies, the united weight of which would equal the coarse

one, and which would give the greatest satisfaction on account of their quality. It is the same with Potatoes, although there are more exceptions among them than among any other vegetables. Among Carrots, good strains of Early Horn are finer than any other kind, and the yield is not very much less than the coarsest kinds; indeed, is sometimes greater. It would be well if your readers who are acquainted with specially meritorious varieties were to add them to the above. The kinds named I can confidently rely on myself, but it is possible that some of them do not succeed as well under other circumstances; and any information will prove of the greatest value, not to amateurs only, but to many others.

SEEDS TO BE SOWN IN FEBRUARY, AND HOW TO SOW THEM.—Supposing the ground to be in the condition left by the winter's digging, it will require some preparation before it is fit for sowing seeds. The first caution I would give is not to tread or work it in any way while it is in a wet condition. The object of laying up soil in a rough state in winter is to get it thoroughly pulverised by the action of the weather. But if you commence working it while it is in a wet condition, you not only neutralise all the good effects of the weather, but you will find it dry very slowly. But supposing it to be in fair working order, the best way to begin preparing light and medium soils, which are in good condition for sowing upon, is to level the rough surface with a Dutch-hoe. A majority of amateurs use a rake; but a rake is a very bad tool for the purpose—it makes too fine a surface, thus excluding the drying influence of air and sun, and it fails to stir beneath the surface. If the soil be heavy, or if it be new soil, over which a layer of rotten manure has been spread, to afford food for the seedlings in their first stages, as advised in our last paper, then the use of the fork will be necessary, so as to thoroughly break and mix the soil. If very stony, the stones should be thrown out in the process, and afterwards carefully raked with a good wide-toothed rake (the new American kind is best), with as little treading of feet as possible, especially at the early season of the year. Where the soil is very poor, and when no rotten manure is forked into the surface, a sprinkling of guano ought to be given; and if part is thus dressed and part not, the difference will be very marked. Rather delay putting in seeds at all than put them in to an ill-prepared or pasty soil. Seeds sown in soil and battered in generally rot; and when they do grow, they come up weakly and unhealthy. Study the calendars and the weather, especially the latter. Gardeners who have to keep up an unbroken supply of table vegetables have to try many shifts to forward crops, such as sowing seeds while standing on boards placed between the rows, to obviate treading the soil, and afterwards covering in with dry light soil kept in store for the purpose.

Broad Beans may be sown any time now, when the soil is in good condition, without any fear for their safety. Draw drills $2\frac{1}{2}$ or 3 inches deep, and from 2 to $2\frac{1}{2}$ feet asunder, according to kinds, dropping in the seeds at from 3 to 4 inches apart. In finishing off, do not rake too finely unless the soil is naturally very dry—even then it is best to leave a rough but neat surface.

Cabbages.—A few may be sown at the end of the month to succeed autumn-sown ones, which may now be transplanted should the weather prove fine.

Cauliflower.—A few seeds may be sown, but they had better be protected by hand-lights on cold frames.

Brussels Sprouts and *Savoy*s we always sow at this season in boxes placed in cold frames, and afterwards prick them out whenever the first rough leaf is

developed, keeping them close to the glass, and well aired in fine weather to prevent drawing.

Leeks may be sown by the end of the month. To grow the great monsters seen at autumn shows in Scotland, sow in heat in pots, prick out when the second leaf shows, and pot on when necessary, hardening off in time to get them planted in very rich soil about the middle of May. Very fine crops can be raised by sowing on a slight hotbed at the end of this month. They will be ready to plant out at the end of May. By this means a small spot of ground, if rich, will raise an astonishing amount of the finest Leeks.

Onions.—Sow the main crop if the situation be good, and the soil light and in fine working condition, otherwise wait till next month. A sprinkling of wood-ashes and soot will help the crop.

Peas.—If none has been sown, get in the first as soon as the soil is in good condition for sowing, and a second sowing soon after.

Parsnips.—Sow by the end of the month if possible, but wait till the beginning of March if the soil be cold and wet.

Parsley may be sown, and *Lettuces*, *Cress*, *Mustard*, and small saladings generally, may be sown in a warmer corner. If they can be helped with glass coverings the produce will be earlier and finer. Mustard and Cress in shallow boxes can be forwarded very well in the kitchen window.

It may be useful to add that seeds should not be huddled together in heaps, but should be sown so that each plant will be perfectly free of its fellow. Give everything plenty room for development. A foot between rows of Onions, Leeks, Parsley, Lettuce, Mustard, Cress, and suchlike, according to the richness of the soil, will be about an average distance. Amateurs generally sow Peas too close. When sown among other things, allow 3 feet from the roots of Peas to the next row of any other crop. If the south-west winds strike the garden, allow $3\frac{1}{2}$ or 4 feet in the lee side of rows, if they run south and north (as they should), and subtract the extra distance from the windward side. If in breaks by themselves, allow from 6 to 8 feet, according to the kinds, between the rows; but most of the varieties recommended are dwarf-growing, and 6 feet will do.

A VILLA GARDENER.



STRAWBERRIES ALL THE YEAR.

THERE has been much written lately about the preparation of Strawberries for forcing, both in 'The Gardener' and in the horticultural papers—some recommending exposure to all weathers, and others more or less protection. I think the value of the Strawberry as an autumn and winter fruit has not received the attention it deserves. Mr Bardney's article in your January number is a step in the right direction. And it is in hopes that my experience in the same way may be of benefit to some of your readers that I add my testimony. Gardeners situated as I am here, who have to grow all my own dessert, will justly realise the value of a handsome dish of Strawberries during the shooting season. A few plants of Garibaldi Strawberries that I lifted in the autumn of 1877 having proved very useful, I determined last season to grow my early plants with the view

of an autumn and winter crop as well as a spring one ; and the result so far exceeded my expectations, that I have been able to send in a dish of Strawberries any time they were required since the beginning of September—not merely a dozen or two, but sometimes as many as six dozen, and that from a limited quantity of plants. At present—the 3d of January—I have a good crop of fair-sized, well-coloured fruit, and will continue to have for at least a month to come. The flavour until December was all that could be desired. Since then, owing to damp, sunless weather, the flavour is rather deficient ; but still the Strawberries are valuable as a dish for the dessert. For the advantage of any who may wish to try the experiment, I will say, do not over-crop in spring, rather sacrifice a few berries than keep them too long in hot, dry quarters ; be very careful in hardening off ; then plant out in the best part of the garden you can spare, without injuring the ball. They will require little more attention, with the exception of watering in very dry weather. If planted in rotation, they will succeed each other in autumn, the earliest forced coming soon after the late outside ones, from which in favourable seasons a good supply may be gathered in the open air. Lift those for autumn and winter in batches, leaving the last out as long as they are safe from frost : use pots a size larger than the plants were turned out of. Keep them rather close until established, then place them in any dry, airy house. My Strawberries have been grown until lately in the same houses where they were forced in spring—viz., an early vinery and peach-house—the proper treatment of the permanent occupants of the houses, and not the Strawberries, being considered. The sort grown is Garibaldi, *alias* Vicomtesse H. de Thury. I believe it could be quite possible to encircle the year with Strawberries from that one variety.

ROBERT CARTER.

WARESLEY PARK.



LESSONS IN DRAWING, ETC., FOR YOUNG GARDENERS.

CONCLUSION.

IN Lesson No. XIII. (January 1878, p. 34), a few hints were given about how to find the centres required to draw the various outlines of walks, &c., on plan fig. 37, by means of the compass. In laying out such a plan as is referred to, some of the curves will be found of too wide a radius to be worked from their respective centres. The carriage-road, for instance, could not be very conveniently taken from the centres as it has been drawn on the plan. The perpendicular lines necessary in drawing a working plan may be retained and

utilised by drawing lines at right angles to them to certain points, and measuring such distances as may be required to ascertain the position of such points on the ground. To make this easily understood, suppose that line *a b*, fig. 63, is one of the lines just mentioned, or that has been drawn (as it really has) for the purpose of measuring from, but drawn *square with* any other lines previously on

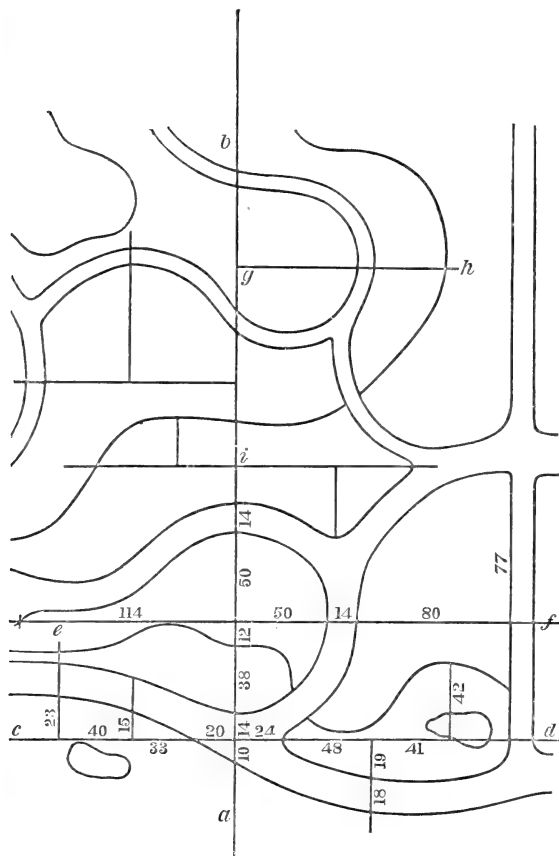


Fig. 63.

the plan. We shall draw another line, *c d*, at right angles to *a b*, and make the intersection of the two a starting-point. This happens to be near the centre of the carriage-road, and from that point to where the line *a b* crosses the edge of the drive, is on the one hand 10 feet, and on the other 14 feet. Mark this upon the plan on the line between the points measured from. Working up the line *a b*,

the next line that crosses it is a shrubby outline, and it will be found to be 38 feet from the edge of the drive, 12 feet from the former line. Another line, *ef*, will be desirable—at right angles, of course; and from this point a fresh start may be made to measure right and left, and further up the line, marking each measurement between the different points. Returning to where we started, and measuring to the left on line *cd*, 20 feet from the intersection of the two lines, another point will be found on the outside edge of the carriage-road: 33 feet from this point draw a short line at right angles to *cd*, which will intersect the edge of the drive 15 feet from *cd*. A similar line drawn at a distance of 40 feet, will intersect it at 23 feet; and so the proper curve of the road may be found without the aid of a centre. In the same way, the curve on the right hand of *ab* may be found by drawing lines

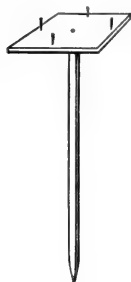


Fig. 64.

from *cd* at various points to cross the road; and measure the distances in the same way as above. These lines must be marked on the ground by means of a rod at each end, and at least one intermediate one. This does not apply to the short side ones, only the main lines. A square will be useful to guide the tape-line in placing pegs at the various points on the short lines, if a line is laid down on the main lines, from which measurements are being taken. At fig. 64 is represented a very simple but very useful instrument for such work as this. It is simply a piece of deal, a foot of 14 inches square, fixed on to the top of a stout rod about 4 feet long. On the top side of the board two lines should be drawn exactly at right angles, and at the extremity of each line a short brad inserted, so that they project from the board half an inch. They must be right upon the lines, and stand straight; the ends will be all the better if filed smooth and round. To show the usefulness of this home-made instrument, we will again refer to fig. 63. The line *ab* having a rod at each end and one at *i*, get a fourth rod and place it at *g*, on a line with the other three; lift this rod out, and place the instrument described above in its place, and turn it round till two of the brads are on a line with the rods on line *ab*. Now, if measurements are wanted out to the right towards *n*, hand the rod taken out at *g* to an assistant, with the end of a tape-line, while you retain the reel, and hold it at whatever distance is required; and at the same time, direct the assistant to place the rod on a line with the two brads on the board, which will give you a line at right angles to line *ab*. Just a hint more to the assistant who is at the end of the line. Place the ring of the tape-line on the fore-

finger or thumb of the hand you intend holding the rod ; take the rod between the fore-finger and thumb about 6 inches from the top, and allow the rod to hang down plumb, keeping the line tight and the rod just clear of the ground. He will thus be at liberty to move easily backward or forward, as he may be directed—moving, as it were, on the circumference of a circle, ready to drop the rod into the exact spot wanted. By this means right-angle lines can be set off without a line at all. This simple instrument is also very convenient when measuring a piece of ground preparatory to drawing a plan, as it is important to have the correct outline, and the positions of any trees or other objects, properly ascertained ; and this can only be done by following a similar course to that just described and illustrated in fig. 63. If a plan of fig. 63 was required, and the measurements to be taken on the ground, similar lines to those shown would have to be stuck out and measured from, and the measurements marked upon a rough sketch in note-book, before the plan could be produced on paper. I have been thus particular to show how a plan can be correctly laid down without the aid of the centres from which they may have been drawn on paper, because I think it sometimes of importance. But however important it may be in connection with geometrical flower-gardens to have everything exactly to fit, I do not wish it to be understood that I would be very particular as to a few feet or inches in laying out such a design as is given in fig. 37. If the ground was all of an even surface, of course there would be no need to deviate in the least from the plan ; but if the ground has been made, or is naturally undulating, the outlines will in many cases vary considerably from your plan—the eyes here taking the place of the compass, to make the curves suit the ground. It will be easily understood that an undulating surface is of greater area than a plain surface of the same dimensions, and for that reason it would not be possible to follow exact geometrical rules ; and if it were possible, it is not desirable, as any one with a good eye can make lines suitable to the ground with less trouble than by the rules of geometry. I believe landscape-gardeners generally have a great abhorrence to anything of geometrical stiffness coming in contact with their few and easy-flowing lines. With this, to a certain extent, no one will differ ; but I think some landscape-gardeners carry their ideas, in some instances, too far in the direction of a *wild garden* where there is no space for that purpose—and many gardeners err as far in the other direction in having too much of the ginger-bread style.

And now I must take leave of those of my friends who have followed me to the end. In my endeavours to go over and be understood on all points mentioned in our programme, I am afraid

I may have repeated myself on some occasions, and that some of the papers may have had a "jumbled" appearance. But I hope these and other faults will not detract from their general usefulness, and that they may be the means of leading some to study that higher art—landscape-gardening.

R. INGLIS.

[We are happy to know that these Lessons in Drawing have been much appreciated by those for whom they were intended. Mr Inglis, we are glad to say, is busy rewriting and improving them for publication in book form. As this is the last lesson in drawing, we intend to publish in our March number the first instalment of 'THE GARDENER'S PRIMER,' also intended for young gardeners.—ED.]



CELOSIAS FOR EARLY FLOWERING.

It is not often that one sees or hears of Celosias being grown except for the autumn decoration of plant-houses. It is the custom to sow seeds at a certain time; and I suppose we are determined to abide by the custom as religiously as if it were an offence to depart from it. I am not writing in depreciation of the value of Celosias as autumn-flowering plants—my desire is rather the contrary, for there is not a class of plants grown that are more useful or more worthy of cultivation, either for cut flowers or as decorative plants. It is only lately that I have been able to secure a strain of Celosias worth cultivating. I have grown as many "weeds" under the name of Celosias as most people; and it was only through the recommendation of a friend that I could be induced to attempt a resuscitation of their culture with anything like spirit. Even annuals require cultivation to make them grow well; but it really damps one's zeal, in cultivating plants from seed, when deceived in the quality of the article purchased. Last year I resolved upon growing a few plants extra well, to come in for the conservatory in July; and by a miscalculation, and probably by a little neglect in shifting at the proper time, they were in full blow early in June. But they came in useful for a purpose I never thought of before—viz., for supplying cut flowers at a time when the principal show of spring-flowering plants was over, and when flowers of any class stand the box badly. They travel so well, and their beautiful feathery sprays, so rich in colour, are so well adapted for giving effect with other flowers, that I venture to recommend the idea of growing an early batch for this purpose to those who have not previously tried it, and who are, like ourselves, hard enough up at times to wind up the season like the "cut and come again" practice of more extensive establishments.

There is always a little dearth for flowers in June, before Roses and other outdoor flowers come in to assist in filling up the flower-basket.

About the first week in February will be a good time to sprinkle a few seeds over the surface of a pan, and cover them thinly with fine earth. Plunge in a bottom-heat of 85° ; and when the seedlings are about an inch long, remove them to a shelf near the light, and keep them regularly supplied with water. When they gain a little strength and will bear handling, they should be pricked off into shallow pans filled with rich mould, which should be placed on the surface of the bed for a few days, where they can be covered with a handlight, or otherwise shaded, and where they will furnish themselves with bunches of fine healthy roots in the course of a few days. They should then be returned to a place near the light, and kept well watered and syringed till they are ready to be shifted into 3 or 4 inch pots. As they are plants of rapid growth, the time or size of the shift is not of great moment (only they must not be allowed to become potbound in a young state, or it will arrest growth and cause them to feather prematurely), but it will be as well to determine beforehand what size of pot the plants shall flower in, and gauge the shifting accordingly. 8-inch pots are quite large enough for all ordinary purposes, so that 4-inch pots will answer for the first potting, and will leave ample room for working in a good addition of fresh soil at the last potting. The soil may consist of any rich compost that has been in use for growing Melons or Cucumbers, with an addition of rough leaf-mould. It should be warmed to the temperature of the house in which the plants have been growing; and if the weather is inclement, it is a good plan to take a portable potting-bench to the house in which the plants are, and have them potted off without incurring the risk of giving them a check. After potting, plunge them again into the bed for a few days, and withhold water, except what is applied through the medium of a syringe, to keep a steady growing atmosphere; and when the roots take hold of the fresh soil, water freely as before. The increase of roots, and the rapidity of growth under this treatment, will hasten the development of the plants in an incredibly short time; and when they are nicely-furnished plants, they can be lifted out of the plunging material, and set on the surface of the bed for a time, and afterwards toned off to a growing atmosphere of between 60° and 70° , where they will require more air, to harden them gradually to stand a lower temperature. At the last potting the size of pot may range from 6 to 8 inches in diameter. Of course those that are shifted into the smallest-sized pot will show their feathery plumes first; so that by using

pots of two different sizes, a succession can be secured from the same batch of plants.

The final shift being given, it will still be necessary to encourage growth (but in a somewhat lower temperature, as above suggested) till the pots are well filled with roots. By this time they will have made nice plants, and will require increased air and light, in order to bring out the beautiful and varied tints of colour which are characteristic of selected types of this well-known annual. They possess the additional advantage of bearing being retarded for weeks if necessary; and, taken altogether, they are about the most simple plants to cultivate, and the most elegant to look at, that we possess.

CULTIVATOR.



CARTON.

THIS is the seat of the Duke of Leinster, the home of the Fitzgeralds, who have figured so long and so prominently in the history of Ireland. Situated in the county of Kildare, it is only some fifteen miles from Dublin, in a flat and fertile country, where bullocks by the hundred may be seen wading in grass to the shoulders, like buffaloes on a prairie. The railway and royal canal run parallel from Dublin to Maynooth; indeed the former seems to be built on the banks of the latter.

Maynooth, an historical name of recent years, is a small quaint country town or big village of one broad street or *boulevard*, with a line of trees on either side parallel with the houses, stretching from the college-gates at one end to the first gate for Carton on the other: neither of which gates is at all worthy of mention as gates to celebrated places, and both strike the stranger as being quite mean; but it must be admitted that finer gates would be quite out of keeping with the immediate surroundings. Having entered the street, about midway from the railway station, one turns instinctively to the left towards the famous College, and approaching the gate, the ruins of Maynooth Castle are passed, once the residence of the Geraldines; scarcely like ruins, however, but magnificent remains of what must once have been a magnificent building. Outwardly there appear two immense quadrangular blocks of ivy-covered wall, rising from the greenest and closely-shaven turf. Never have we before seen Ivy in such grandeur; there looks like an acre of it, standing perpendicular, of the greenest, most luxuriant colour. Irish Ivy, we dare assert, and where Ivy is at home.

If the poet Gray had seen these towers, he would have devoted a whole stanza to them, for they are indeed ivy-mantled; and they are inhabited also by numberless starlings and jackdaws and swal-

lows, and maybe moping owls, and many other forms of life may be seen for which this rare old plant forms a shelter ; and it must have taken hundreds of years to creep over these ruins old, and to gain its present strength.

Within the college-gates grows an ancient Yew-tree, which may have been planted by some one of the former inhabitants of the ancient castle. Outside it seems old enough to have been a tree when Ireland was first annexed to the English crown, or it might have been a bush when William came over from Normandy and annexed England to his own. It is the most perfect and healthy of any old Yew-tree we ever saw of the same age ; indeed there does not seem any sign of decay, so far as we remember. The bole is like an immense fluted column, smallest at the very base, and widening as it rises to the branches ; and we should say that the diameter may be 5 feet at the widest part, of solid timber. We have seen Yews of greater diameter, but decayed in the heart. This tree alone is worth the journey from Dublin to see. Of Maynooth College we have nothing to say horticulturally, except that in the kitchen we saw and smelt the conversion of an immense caldron of Cabbages, after boiling, into food beautiful and savory for the 500 students about to sit down to dinner ; Potatoes also, and a caldron of cocoa undergoing an infusion of two hours for *tea*. There is a college-park, and lawns and shady avenues.

Repairing to the ivy-mantled towers and along the *boulevard*, we enter a long, straight drive, with broad margins, 60 or more feet of Grass, with a line of trees, Spanish Chestnuts, and Limes on either side ; and in the far distance the eye encounters another gateway, with dense masses of foliage in the background. The long avenue has a bare, uncomfortable look about it ; but one feels that some old patrician home is near. Through the gate, which is substantial, if not imposing, the drive crosses a handsome modern bridge, which spans a narrow part of a large lake, and from which some good views are had of the lake and park and masses of large oak-timber. Over the bridge, the visitor finds himself in dressed ground, a highly-kept drive, margined with choice evergreen shrubs and conifers and shaven Grass, which winds around an incline to the carriage front of the house, which does not call for much attention.

The kitchen-garden is very large, say 9 acres, intersected by fine old Yew-hedges and cross-walls ; the soil heavy, and the situation apparently wet ; the walls admirably covered with well-trained Pear-trees of all the leading sorts, and laden with fruit. There were large quantities of very fine Strawberry-plants in pots ; a long border full of herbaceous materials and annuals for spring bedding, in fine health ; a long range of Peach-houses, the trees in fine health and training ; long ranges of vineries ; and some venerable Fig-trees,

introduced from Italy by this or a former Duke, and allowed to grow in a natural sort of way, with innumerable quantities of Figs of the White Mar-seilles or some small sort. There are also several plant-houses stocked with decorative plants, of which *Eucharis amazonica* was prominent; and we also remember that the hot-water men were busy, and things consequently topsy-turvy. The gardener's house is most pleasant and commodious-looking, with a pretty and extensive piece of flower-garden in front.

Through a gate in the garden-wall, and we were into the pleasure-grounds: and here much pleasure awaited us. One of the prettiest lake-scenes was presented to us which we ever remember to have seen in a garden—a most natural-artificial lake, the outline excellently managed. It was, however, in process of cleaning out, and its beauty could not be so well appreciated except in imagination. One side is entirely overhung by a majestic bank of foliage; the other and lower end was fringed by sloping glades of grass interspersed by shrubs and conifers, Pampas Grass, and Tritomas: in the centre was a long island entirely overgrown by luxuriant vegetation; and a striking feature of this island, and one much admired, is shrubs of all sorts overhanging the water to such an extent that no landing from a boat seemed possible—Willows, Dog-wood, Rhododendrons, and all sorts of entangled vegetation, seemed floating or growing out of the water. At one point, both arms of the lake could be seen lost in the distance among overhanging branches, suggesting unknown extent, and the possibility of African Stanley penetrating round the distant bend in a canoe of savages.

Still farther we wended our way through a wild garden and groves of large forest-trees; and again a subtropical garden appears, with beds of Cannas, Tobacco, Wigandias, and some grand old trees of *Liriodendron tulipiferum*: and here was also a majolica balustrade round a fountain or something which did not invite our taste. Suddenly at a turn a brace of peacocks in Yew decoyed us into a semi-private part of the grounds. These birds were perched a considerable height, and were admirable specimens of the clipping art; the tails and head and beak were excellent. Here were also several fountains in Yew, with basin above basin, repeated five or six times, the climax of the hedger's art—just as the genius in confectionery who can fashion a ginger-bread cake may yet aspire to a bride's cake.

Proceeding round a turn, we come suddenly on an elevated position on the top of a flight of steps, in front of a magnificent broad vista of several hundred yards' length, along a terrace parallel with the front of the mansion. Half of the distance is enclosed on each side by high masses of foliage, within which on each side are lines of the Florence Court Yew—grand specimens—their huge black green masses contrasting with the emerald green of the turf. Down the middle of this vista is a broad walk which leads to the flower-garden in front of the house, where the usual glories of the Pelargonium and Calceolaria are to be found. Violet Hill Nosegay was here, and Mrs William Paul, both very gay; and the white-flowered, white-foliaged Mont Blanc. A feature of this garden is, that it is laid out in panels of Yew, cut as if by machinery, two or three feet high, straight and level, in a style seldom seen in England, and not at all in Scotland. The mansion is of a white polished limestone, Roman in style—not in the most fortunate position, one would suppose, though spacious and handsome enough. We are, however, not half done with the pleasure-grounds, for we have a walk of a mile by the margin of the large lake first seen on entering the gate, winding through shrubberies and plantations, with many varied scenes at every turn, until, passing a long bridge over a dam and

cascade, where we first realise that the lake is artificial, we enter the cottage flower-garden—a sweet little garden of varieties in Roses, and arbours, and shrubs, and borders, and bedding of Pelargoniums, and succulents, and hardy carpeting-plants. The cottage itself is almost unique—a piece of fancy-work like a cabinet from floor to roof. The pavement of the veranda is a piece of mosaic itself in small pebbles, one design in commemoration of the visit of Queen Victoria to Ireland. Within is a room of curiosities, a museum of antiques, foreign and native; and still within is another room, exquisitely done in shells of every imaginable shape and clime, which cannot be described—the design is marvellous, and marvellously executed, and all by ladies of the Fitzgerald family, with the help of an old labourer. This is only surpassed, so far as we have seen, by the grotto at St Giles, in Dorset, which is, of the sort, possibly the finest thing in the three kingdoms, or elsewhere. Returning by the opposite side of the lake, the dressed grounds are still on an extensive scale of undulating slopes, with fine old forest-trees, and modern Conifers, very old Cedars of Lebanon with lobes 3 or 4 feet in diameter, Tulip-trees, old Larch and Scotch Firs, a very large and old Cupressus funebris, which must have been planted on its first introduction, which has now assumed a habit distinct altogether from the plant in its young state. A hunting-tower on a rising ground within the park has a fine effect from beyond the lake; and a monument to the late Duchess is seen for many miles in all directions, even to a point very close to Dublin. We—for there were three of us—returned by the long avenue to Maynooth much delighted, with only one regret, that Mr Knowldin was, like ourselves, from home.

THE SQUIRE'S GARDENER.



THE CULFORD VINE SPORT.

I WAS under the impression that the above "sport" had vanished. I observe, however, in 'The Gardener' for January of the present year, that it has appeared in the past season at Brayton Hall, and gather from the remarks referred to that Mr Hammond is doubtful whether the Brayton "apparition" was a genuine Golden Champion or not. I think, however, that a little consideration of the scientific reason given for the "sport" at Culford will convince Mr H. that the bunch with the large berries produced by his Trebbiano Vine last season was a real Golden Champion. If I remember aright, the appearance of Golden Champion Grape on a rod of Trebbiano at Culford was accounted for at the time on the "gemmule theory" by one of the gentlemen who saw the "apparition." He supposed that a gemmule had escaped from the rod of the Champion, and found its way into the rod of Trebbiano, both rods having originally been grafted on the same stock, and that, after the Champion had been entirely cut away, the said gemmule, in due season, developed into a bunch of Champion Grapes on a particular shoot of the Trebbiano rod. True, the Golden Champion has some peculiar properties, but the most singular of all is being able to reproduce itself by means of

its gemmules escaping into other varieties of Vines. But possibly there is only one Champion gemmule in existence capable of doing so, and it is to this erratic individual that the appearance of the large-berried bunch on the Trebbiano Vine at Brayton last year is to be attributed. When the cuttings taken from the Vine that originally produced the "apparition" at Culford were sent to the Tweed Vineyard, it is quite possible that one or other of them contained this gemmule, and on its way north it may have thought that the atmosphere of Tweedside, and the general treatment it would receive under Mr Thomson's care, would not be favourable to its development into a full-grown Champion. It therefore, before reaching Carlisle, decided to remain south of the Tweed, and on arriving at the Border City escaped from the cutting; and instead of returning to its old quarters at Culford, made its way to the Brayton vineries, and there found a Trebbiano of the right sort, of which it immediately took possession, the result being as described in the number of 'The Gardener' already referred to. And now that Mr Hammond has apparently got possession of this wandering gemmule, I hope he will induce it to remain at Brayton, and to become of "steady and temperate" habits befitting the locality—not going up and down, as hitherto, among the vineries of the nation, changing the outward appearance of other varieties of Grapes in such a manner that even men of "competent authority" are unable to identify a Trebbiano from a White Tokay. It strikes me that Brayton is rather an uncanny place; for did not Mr Hammond show at the Carlisle show in 1877 a bunch of Buckland's Sweetwater with such abnormally large berries that a London contemporary—a "competent authority" too—reports of it as a Golden Champion. Really it is high time this gemmule was put under arrest. B.



SCOTTISH HORTICULTURAL ASSOCIATION.

THE monthly meeting was held in the Hall, 5 St Andrew Square, Edinburgh, on Tuesday evening, the 7th ult.; Mr Dunn, President, occupied the chair. Mr John Sadler delivered a lecture on the "Fungi." This division of the vegetable kingdom, he remarked, contained 6000 genera and 25,000 distinct species known to botanists. They were wonderfully diverse in appearance and very widely diffused, every organic substance, animal and vegetable, living or dead, being liable to their attacks. After a full and clear statement of the results of scientific research into the physiology of the more prominent and interesting of the various classes into which they are now divided, the lecturer proceeded to describe a number of the Mushroom or Toad-stool species, 700 of which were indigenous to Great Britain: these included the edible kinds, which were not only palatable but wholesome. They were, however, so

far as our present knowledge goes, remarkably few in number, the great majority having been proved to be very poisonous ; and while no absolute rule could be laid down for distinguishing them, he had found that the dangerous ones when tasted caused a burning sensation to the tongue ; and in urging upon gardeners the importance of giving attention to the subject, counselled them to exercise great caution, as fungoid poison was both insidious and fatal. The lecture, which was listened to with the greatest attention, was illustrated by a number of specimens, a series of beautifully executed diagrams, and a few wax models.

A communication was read from Mr Hugh Dickson of the Belmont Nurseries, Belfast, stating that specimens of *Dracæna indivisa* and *Araucaria excelsa*, 10 feet and 8 feet in height respectively, in the open air, had been killed by the frost, while a plant of *Chamærops excelsa*, so far as could be seen, was uninjured, though the thermometer had been down to zero.

Mr Alex. Macmillan, The Gardens, Broadmeadows, Berwick, sent for exhibition cut blooms of 39 distinct varieties of *Chrysanthemums*, and 26 trusses of *Zonale Geraniums* : they were all in fine condition, and admirable examples of good cultivation. Of these the finest were—

Chrysanthemums.—Boadicea, rose and cream, incurved petals ; Rival Little Harry, golden amber ; Hereward, purple, back of petals silvery ; the Globe, blush, incurved ; Red Dragon, chestnut Red, tipped with yellow ; Mount Etna, white, rose tipped ; Undine, cream, tipped with lilac ; Chang, orange red, back of petals yellow ; Alma, rosy purple, incurved ; Meteor, orange yellow ; Fingal, rose violet ; Princess of Wales, pearl white, tinted rose ; Countess of Granville, pure white ; Duke of Edinburgh, rose lilac, light centre, incurved ; General Bainbridge, dark amber, gold centre ; Guernsey Nugget, pale yellow ; George Peabody, pearl white, back of petals lilac, incurved ; Emblem, rosy purple, incurved.

Geraniums.—Pirate, dark scarlet ; Henry Jacoby, very dark crimson ; Lady Byron, rosy pink, white eye ; John Gibbons, orange scarlet ; Mr Gladstone, scarlet, shaded with purple ; Mrs Vickers, salmon, white eye ; Walter Scott, bright crimson ; Captain Holden, bright crimson ; Little Carr, crimson scarlet ; the Shah, scarlet, dark venation ; Lizzie Brooks, salmon scarlet, white centre ; Mrs Pearson, cerise scarlet, salmon eye.

Mr L. Dow sent a specimen of Swedish Turnip with blanched leaves, treated in a similar way to Sea Kale, which was said to be an excellent substitute for that vegetable.

It was intimated that papers would be read from Mr John Caie, The Gardens, Inverary Castle, on "The Arrangement of Trees, Shrubs, and Climbers in Pleasure Grounds," and from Mr Burns, Thingwall Hall, Birkenhead, on "Acclimatising Plants."



NOTICES OF BOOKS.

THE GARDENERS' YEAR-BOOK AND ALMANACK FOR 1879. By Dr Robert Hogg, LL.D., 171 Fleet Street, London.

This welcome little annual is, as usual, replete with useful information. In addition to a very excellent practical calendar of garden operations for every month, it contains many excellent garden receipts, and particularly for

the making of home-made wines. It gives a list of the new plants, fruits, and vegetables of 1878, and many elaborate treatises on the cultivation of popular flowers, &c.

THE HORTICULTURAL DIRECTORY (also published at 171 Fleet Street, London), as usual, gives the full addresses of metropolitan and provincial nurserymen and florists, and of the gardeners of the United Kingdom, with their employers' names and nearest railway station; as well as a list of botanic gardens, public parks, botanical and floral societies, and the names of their managers and secretaries. These two annuals should be in the hands of every gardener.



THE WEATHER IN DECEMBER 1878.

THE following are the lowest readings of the thermometer at—

			Rainfall, 1878. Inches.
Chatsworth, Derbyshire—Dec. 24 and 25,	. . .	0.4°; 0.4°.	
Lambton Castle, Durham,	. . . . .	0.2°;	30.11
Drumlanrig, Dumfriesshire—Dec. 23, 24, and 25,	. . . . .	2°; 2°; 1½°.	40.7
Rokeby Park, Yorkshire—Dec. 13,	. . . . .	3°.	
Brayton Hall, Cumberland—Dec. 13,	. . . . .	2°.	
Thoresby Park, Nottinghamshire—Dec. 25,	. . . . .	4°; . . .	26.46
Meldon Park, Northumberland—Dec. 20,	. . . . .	4°; . . .	33.18
Tynningham, Haddingtonshire—Dec. 14,	. . . . .	5½°.	
Hope Park, Stirlingshire—Dec. 20,	. . . . .	7°.	
Fordell, Fifeshire,	. . . . .	10°.	
Margam Park, Glamorganshire, S.W.,	. . . . .	14°.	
Glendoune, Ayrshire—Dec. 20,	. . . . .	8°; . . .	35.24
St Phoenix Park, Dublin—Dec.	. . . . .	8°.	
Shottley House, Durham,	. . . . .	. . . . .	31.6
St Ridge Park, Lanarkshire—Dec. 20,	. . . . .	2°.	
Mr Forbes' Nursery, Hawick, Roxburghshire—Dec. 20,	. . . . .	5°.	

If any of our readers have registered lower temperatures, we shall be glad to hear of them.



PRESENTATION TO MR WILLIAM SUTHERLAND.

ON the 20th December 1878 about forty gentlemen (including the leading gardeners about Liverpool, and other friends of our valued contributor Mr Sutherland) assembled at the Public Rooms, Aigburth, for the purpose of making a presentation to that gentleman on the occasion of his retiring from the management of Messrs Ker's Nursery at Grassindale, near Liverpool, to undertake the management of Messrs Ireland & Thomson's Nurseries in Edinburgh. The gift, which consisted of a very handsome gold watch and appendages, was supplied by Messrs Elkington of Liverpool, and was in recognition of the sterling character and gentlemanly demeanour of Mr Sutherland, who, during his stay in the neighbourhood, had won the esteem, if not the affection, of all with whom he was brought in contact.

Mr Francis of Rosemount presided on the occasion, with Mr Fowler as vice-chairman ; and the presentation was made in a complimentary address by Mr W. Hinds of Otterspool Gardens, and was appropriately acknowledged by Mr Sutherland.

The watch bore the inscription, "Presented to Mr Wm. Sutherland by Liverpool gardeners and friends, as a token of their esteem and respect. Liverpool, Dec. 20, 1878." The letters W. S. were also cut in monogram on the outer case.



Obituary Notices.

WE regret very much to have to record the sudden death, on the 13th January, of Mr Thomas Methven, of the firm of Messrs Methven & Sons, Edinburgh. Mr Methven had, by his industry, professional ability, and business tact, been eminently successful as a Nurseryman. He raised himself to a position of usefulness and esteem as a citizen, and for some time filled the honourable position of senior magistrate of the city of Edinburgh. During his career as a Nurseryman, extending over a period of more than thirty years, he did very much, by personal influence and substantial material aid, for the advancement of Horticulture and Arboriculture. He was very widely known and much respected among a large circle of Horticulturists and friends as a genial and warm-hearted friend. His decease is therefore much regretted, and his sorrowing family deeply sympathised with.

Many of our readers will be sorry to learn of the decease, on January 2d, of our occasional contributor and long-valued friend, Mr A. Dawson, who began his career of gardening at Huntly Lodge, Aberdeenshire. In 1834 he removed to England, where he filled several responsible situations as steward and gardener with very much success. For thirteen years he acted in this capacity at Rood Ashton, Wiltshire, over a large farm and garden. Eleven years since he was appointed estate manager at Weald Hall, Essex, to Mr Towers, the son of one of his former employers. Few men have been more highly valued and esteemed by their employers. Mr Dawson was one of Nature's noblemen—much more influenced by the highest aims of life than anything else, and by which he was governed in all his relationships. Many will bear us out in saying that those who knew him best loved him most.



Calendar.

KITCHEN-GARDEN.

IN most cases the stock of garden seeds will have arrived, and along with them the usual garden requisites ; and whether the items may be in large or small quantity, it is well to put them in safe quarters and arrange them alphabetically, either in drawers with names outside, or on dry shelves placed in the most come-at-able position possible. It is a practice by many to prove their seeds before sowing them—by counting a number of each, sowing or planting them in small pots, and raising them in heat and moisture. In absence of glass for the purpose, it may be done successfully in a warm room or cup-

board—as, when they vegetate, they are counted and notes taken, then cast out. Disappointments are in this way prevented, and the good name of the seedsmen often preserved. When seasons are variable, very wet and cold, good seeds may be destroyed in the ground. Most seedsmen prove their seeds before they are sent out. On this practice depends their own interests. It is oftener that kinds under strong recommendations are proved to be no better than old favourites, than to find that seeds are bad in quality. It may be possible that many with limited labour-power are in arrears with their work. The long severe winter will, no doubt, affect many; but no opportunity should now be lost in forwarding operations, whether for forcing vegetables or preparing for them in open garden-ground. All who have materials and accommodation will now be forcing the usual vegetables so much in request at this season. It is too often the case that some are expected to give large supplies with inadequate accommodation—so many kinds requiring different treatment are grown in the same structure. Crowding is sometimes resorted to, and then the produce may not be so good as a neighbour's who has every means at command. Market-growers, who have to be alive to economy, always adapt their circumstances to their means: to cram or attempt the growth of produce by means not adapted for the purpose, is profitless and unsatisfactory. Successions to “crops on the way” must have attention. When there is a demand all through the forcing season, it is always safe to start small quantities often. Rapid forcing often defeats the object in view by growing tops instead of roots or tubers, as in the case of forced Radishes, Carrots, and Potatoes, which require very little warmth at root, and next to no artificial heat at top. Asparagus, which is so easily forced, should have a light or two filled with roots every ten or twelve days, keeping the crowns clear, but placing them as close together as possible; a little mild warmth will bring the “grass” forward rapidly. Sun-heat, harvested, when there are opportunities of turning it to account, will now do much to forward the crops; but a close, stagnant atmosphere will do much harm by giving weakly heads and bad flavour: a wat-

ering with tepid guano-water occasionally may be of much service. French Beans are now easily forced. They come up rapidly and strong, and ought to be near the glass when they have vegetated. We prefer potting rather firmly, using plenty of drainage. Whether the seed is sown in the pots, three parts full of soil, where they are to fruit, or in small pots to be transferred to larger ones, warm soil in each case is of primary importance. The plants coming through the soil strong is an indication that there are good healthy roots, the true antidote to red-spider—French Beans being the favourite food of this pest. Planting out in frames, pits, or other structures, is a good practice; labour is saved, and large crops of Beans may be had with little attention. Use the syringe carefully when the plants are in flower; give air early in the day; avoid cold draughts; dust a little soot over the soil; when roots are abundant, give soot-water, guano-water, or some other wholesome liquid, but not thick, muddy manure-water, which would sour the soil. A surfacing of old mushroom-manure, rotted turf, and manure, mixed, does well for filling up the pots when the plants require help; and this is the chief reason why the seed is sown with the pots only three parts filled with soil. Syringing with clear soot-water—not over-strong—is good for the plants, and an enemy to thrips and spiders. Newington Wonder, Osborne's Canadian Wonder, and Sion House, are general favourites, being very productive. Another frame or pit for Horn Carrots may be sown now; or if the demand is not large, a border, sheltered by a fence or other means, may be prepared and sown. Sandy soil finely broken is very suitable, and should be fully exposed to sun: a sloping border is very desirable. A sowing of Radishes between the Horn Carrots will come in useful. Early-framed and French Breakfast Radishes are very desirable kinds at present. Protection by wire-netting placed over a framework, or common nets on hoops, may be necessary against birds and mice. Red-lead sown with the seed is a good preventive. Mustard and Cress will have to be brought forward in heat for some time to come. Boxfuls, potfuls, or panfuls brought on by weekly sowings will keep up regular supplies. In towns where

other means are not available, Mustard and Cress is often raised in the kitchen, and when in leaf, is transferred to the window during the day, and brought under cover at night. "Thread" Onions are treated in a similar manner; but they endure less heat, and without air are worthless. Capsicums may be sown in fine soil. Sprinkle the seed thinly, and cover it finely. Place in heat about 70° (less would do). When the seedlings are up, pot singly, using warmed soil. Water with tepid water, and grow them with plenty of light after they have showed signs of actual growth. Mushrooms should be brought forward in beds made every ten or twelve days. This precarious crop under the most skilful treatment fails, and often when no trouble or care is taken, abundant supplies are had; and beds coming in frequently are more likely to meet a continuous demand than a few large beds made during the course of the season. Seakale and Rhubarb may now be brought on with ease under any system; some have a clinging to the system of covering with leaves or other fermenting material; and this is a simple matter after the crowns begin to move, their natural season of growth having now begun. The same may apply to Rhubarb; its moving naturally now and little help bring it in fit for use. The lifting of the roots, a custom so general with Seakale and Rhubarb and Chicory, may be continued till the crowns are moving. Placed under a stage where there is a little warmth allowed for plants in the structure, in a frame or pit, sufficient to keep growth moving, produce in abundance may be had at little expense and labour. Seakale must be kept dark, and air excluded, to have it fine. Seakale, Beet, and Chicory and Chicory-roots, require to be in quarters closed in from light and air, whiteness and tenderness being their best properties. Tomatoes now in heat for summer supplies should be kept near the glass. Pot them firmly, as the roots require room, and always give air when the state of the weather will allow it. Those fruiting must have their useless growths rubbed off before they get to any size. The plants should not be allowed to bear heavy crops at this season, as there is yet little action at the roots to sustain

many fruit on one plant. Herbs in demand at this season in a green state are easily brought forward, by potting a few in any ordinary soil, giving them a little warmth, and sprinkling them occasionally with the syringe or fine rose of a watering-pot; a watering at the roots to moisten all the soil is necessary. The kinds in request are Tarragon, Mint, Fennel, and some Sorrel, to keep a supply of fresh leaves. Celery may be sown for a small early supply. This is often destroyed for want of light and air, accompanied with a high temperature. We have found the treatment given to Radishes, Carrots, and Potatoes in frames, raise seedling Celery well. Extremes and sudden changes destroy the vitality of the young plants, and render them worthless by their premature running to seed. Sow seed of Cabbage, Savoy, Kale, or Borecole (Greens in some northern localities), Leek, Brussels Sprouts, Lettuce, Cauliflower, and Parsley, on a warm, deeply-dug border. These will come in early for first supply. The seeds, sown on a dry day, and covered with fine kindly soil about the middle of the month, will vegetate freely. Hoops on which mats can be placed for shelter, will do much for their benefit during severe weather. Handlights, shallow frames, or frame-lights placed on bricks, are of much value where better protection is not afforded. Get land prepared, by trenching, digging, and manuring, for crops as speedily as circumstances will allow. The plain crop of Onions may be sown on well-trenched ground made firm on the surface. Sow thinly in rows 1 foot to 18 inches apart (according to strength of ground); cover them very lightly. The soil ought to be finely broken; and dry Celery-ground, well trenched, is very suitable for Onions. Parsnips may also be sown for main crop, but one must be guided by the weather and state of the soil. Sow Peas and Broad Beans twice during the month. Spinach may be sown between them; or the Peas a good distance apart, and Beans between them. Peas and Beans in boxes must be kept growing slowly by allowing them plenty of air and light. Let every growing crop be stirred with a hoe or prong to keep the soil open.

M. T.

FORCING DEPARTMENT.

Pines.—Early Queens from which ripe fruits are required in May and June, and that have been subjected to increased top and bottom heat as directed in our Calendar for January, should, if all goes rightly, have the embryo fruits discernible in their centres by the end of this month. Probably the cold weather, and consequent more moderate temperature, may keep them a little later. Be that as it may, let each plant be examined, and as soon as the fruit is seen, give them as much weak guano-water as will thoroughly wet the ball if they are dry. But in the case of any plants that do not show fruit, it is best to withhold water until they do start, or they may make a growth before they start, and consequently be retarded beyond the time they are wanted. The sun having more power now, and there being more chances of shutting up with sun-heat, the temperatures in mild nights may run up to 75° at 10 P.M., allowing it to drop 5° or 8° before daylight. But should cold frosty nights prevail, be satisfied with 5° less. The atmosphere may be kept more moist—not by steaming the pipes, but by sprinkling the paths, &c., from whence it evaporates more gradually. As daylight increases, fruit that started late in October and early in November may be pushed on more briskly, shutting up the house early, so as to run the heat up over 80° for a time, always accompanied with a corresponding amount of air moisture. The bottom-heat for these should be kept at from 85° to 90°, and the soil be regularly and moderately moist, applying weak guano-water every time they require watering. Early autumn suckers that are in 6 and 7 inch pots should now be examined; and if their balls are at all matted with healthy roots, they should be put into their fruiting-pots by the end of the month. If at all dry, water them at once, and keep them moderately moist; and when shifted, see that they are in a medium condition in this respect. The soil for potting these should be put into some place to warm and become rather dry before it is used. It should consist of a moderately light loam that has been stacked for six

months or more, and from which most of the fine earthy matter has been shaken. To every 2 bushels of soil add an 8-inch potful of bone-meal and a 6-inch potful of dry fresh soot. Later suckers will now require more water, a moister atmosphere, and a slightly higher temperature. The night temperature may be advanced to 65°; and if the bottom-heat is below 80°, let means be taken to increase it by 8° or 10°. Keep plants intended to start into fruit in March still rather cool and dry.

Vines.—Especially during the day, and when the vinery can be shut up early with sun-heat, the forcing of early Grapes from pot-Vines may now be carried on more briskly. Under such circumstances the heat may run to 80° for a time in the afternoon—the fires being quickened in time to prevent it from sinking below 70° at 10 P.M., allowing it to drop to 60° at daylight. When the weather is cold, a lower midnight-temperature is much preferable. All rapid forcing, to be successful, should be done under the influence of sun-heat. Give these a little air early in the day, gradually increasing it till noon, when it should be gradually reduced, and the house shut closely for a few hours in the afterpart of the day, and at dusk putting on a chink of fresh air, according to the state of the external temperature. Whenever the berries attain the size of Radish-seed, thin them, and avoid over-cropping: six good bunches on a pot-Vine will be much more satisfactory than a half more. Give a dessert-spoonful of Standen's Manure every week, and water with clear manure-water every alternate time, keeping the balls regularly moist. Thin off all superfluous bunches from advancing crops on permanent Vines, leaving bunches that are compact and short. The night temperature all through this month is sufficiently high at 60°: unless the weather be mild, it may go to 65°, managing as regards sun-heat and ventilation as directed for pot-Vines. If the chief part of the roots are in inside borders, see that they are kept moist, and water occasionally with manure-water. Supply sufficient moisture to

the air to keep it healthily moist, but avoid a steamy state of the atmosphere. Tie down the shoots of later Vines, and stop those that are still later at two joints beyond the best bunch, and the laterals at the first leaf. Start succession-houses, observing the conditions laid down in former Calendars. Prune all Vines from which the Grapes are cut, dressing all wounds with styptic, cleaning and otherwise putting all connected with them in a state ready to be started when the time for it arrives. Examine Grapes that are still hanging on the latest Vines, removing all berries that show signs of decay. Keep the house dry, and the temperature as steady as possible at about 45° at night. Any that are bottled in fruit-rooms should also have a steady temperature and dry atmosphere, and the bottles kept full or nearly so of water. Put the requisite number of Vine-eyes into heat about the 10th of the month, inserting them singly in 4-inch pots, plunging them in a bottom-heat of 80°, in a light pit, in a temperature of 60° to begin with.

Peaches.—Should the weather be cold, do not increase the temperatures recommended last month for the early trees. Peaches should never be subjected to what may be termed hard forcing until after the fruit are stoned. Syringe the trees with tepid water every fine afternoon, and otherwise keep the air genially moist. Where the fruit have set thickly, thin off all the smallest first. Disbud the young growths by degrees, ultimately leaving, in the case of well-furnished trees, a strong bud at the base of last year's shoot, and of course the terminal bud. Give air every fine day, and shut up early, so that the thermometer runs up 10° or 15° above the temperature proper for the night, which should not exceed 60°. Let the inside border be kept moist. Give trees in bloom a free circulation of air when not frosty. Avoid the application of much fire-heat, and be satisfied with 55° as a night temperature. Houses started this month may have a few degrees more heat to begin with than is judicious earlier in the season. If any trees remain unpruned and untied in late houses, complete such work without

delay. Keep the latest still cool and well aired, but see that all borders under glass are well moistened; for if allowed to get too dry, the trees may drop their buds before they expand.

Figs.—Early trees in pots will now be pushing freely, and every care must be taken to keep them moist at the root, and to supply the air with moisture. Syringe freely every day at shutting-up time. Air rather freely on fine days, to keep the shoots strong. Now is a good time to start permanent trees from which two crops are to be taken. Give them a moist atmosphere, and a temperature of 55° at night to commence with.

Melons.—The early plants will be ready to plant this month. Let the soil be a rather strong loam, with about a fifth part of well-rotted manure well mixed with it. Train the plants up the wires with one stem until within a foot of the top, and then stop them. Do not give very much water at this early season, or they may make unfruitful growth. The night temperature should range about 70°, with a rise of 10° by day with sun. Sow at the beginning and near the end of the month for successional crops.

Cucumbers.—See last month's directions. Increase the heat slightly, and chiefly by day. Early plants will be ready to plant out this month. Use a rather light soil, with a fourth part of well-rotted manure. Do not give too much soil at first, but rather increase the quantity by degrees as the roots show at the sides of the hills. If the weather be frosty, air will have to be carefully given, so that no breath of frosty air reaches the foliage. Bearing plants will now require more moisture, both at the root and in the air.

Strawberries in Pots.—In mild weather those which have set their fruit may have the temperature increased to 60° in cold and 65° in mild nights. They will also require a more plentiful supply of water, and must never be allowed to get too dry. Plants in bloom should not have more heat at night than 55° until set. Continue to introduce succession lots of plants fortnightly, according to the accommodation for forcing and the stock of plants.

Notices to Correspondents.

All business communications and all Advertisements should be addressed to the Publishers, and communications for insertion in 'The Gardener' to David Thomson, Drumlanrig Gardens, Thornhill, Dumfriesshire. It will further oblige if all matter intended for publication, and questions to be replied to, be received by the 14th of the month, and written on *one side* of the paper only. It is also requested that writers forward their name and address, not for publication unless they wish it, but for the sake of that mutual confidence which should exist between the Editor and those who address him. We decline noticing *any* communication which is not accompanied with name and address of writer.

We have to thank several correspondents for their valued papers, unavoidably postponed for want of space.

GARDENER.—Rasps ought to do well with you on a north border—much better than in the garden quarter, where you say the soil is loose and light. Manure and work the ground well, and afterwards never dig, but spread the manure on the surface and merely fork the surface, mixing in the manure with the surface soil, but never disturbing the roots.

E. ST A.—Divide your Christmas Roses either in autumn or immediately they are done flowering—the latter time is probably the best. A loamy soil of medium character as to stiffness suits them best, and they do well in slightly shaded positions, but are not particular in the latter respect.

J. H.—A paper on Violets in our next issue.

CORRESPONDENT, PORTREE.—The saddle is considered one of the very best forms of boilers, and certainly we do not advise you to take it out. There must be something connected with the arrangement of the pipes, or the flues round the boiler, but what the fault is we cannot say unless you send us a correct plan of the pipes and boiler, or describe them. A very small saddle-boiler would heat four times 120 feet of pipes.

C. B. A.—No. 1, *Elaeagnus japonica aurea*; No. 2, *Andromeda floribunda*; No. 3, Without flowers cannot determine; No. 4, *Hedera Helix tricolor*.

R. H.—Try paraffine at the rate of six dram-glasses to four gallons of water. Keep it well mixed when applying it for the ants. We are presuming that there are no roots in the way. Also lay down flat pieces of soft glazier's putty, to which they will go in thousands, and can there be destroyed.

VERA.—We cannot say what is the cause of your Crocuses coming up as you describe. They will probably come right by-and-by.

R. E. S., LAURENCEKIRK.—The following are 24 *Gladiolus*, all for exhibition varieties:—Grace Darling, Marshal Bazaine, *Lycoris*, Octavie, Ossian, Rosa Bonheur, Sir J. Paxton, Dr Hogg, Duchess of Edinburgh, Le Vesuvé, Scopas, Sir G. Nares, Horace Vernet, A. Verschaffelt, Rev. J. Berkeley, Queen Mary, Hercules, *Astrée*, *Virginalis*, Eurydice, Princess Mary, Michel Ange, Shakespeare, Sappho.

AMATEUR will find the following 12 early and 12 late *Phloxes* well worthy of his attention:—

12 early-flowering: Forerunner, Lady Musgrave, Mrs James Young, Mr Archibald Fowler, Mauve Queen, Beauty, Gem, Mrs Hunter, Dowager-Duchess of Athole, Luna, Magnum Bonum, Swan.

12 late-flowering: Alexander Shearer, George Smith, Uncle Andrew, John Anderson, Thomas Peacock, Vesuvius, Chanzy, Coccinea, Madam Maissoneaux, Mrs Aberdeen, Resplendens, Oscar Beyer.

THE GARDENER.

MARCH 1879.



VINES IN PITS FOR EARLY FORCING.



THE cultivation of Vines in pots for early forcing—now an established custom in gardens—was perhaps the best idea that ever suggested itself to modern cultivators of the Grape Vine. It has saved the permanent Vines in early houses from being forced at an unnatural season, and it is always a ready means of filling up a gap temporarily when other resources have failed. It is also an excellent plan of utilising space, for a season or so, after young Vines have been planted in new houses, as well as affording scope for variety in cases where aspirants to Grape-culture in a small way desire to have mixed subjects in the same house.

We refer briefly to the advantages of pot-Vine culture, not with the idea of giving an introductory harangue, but with a wholesome dread of some one who has been well served by the system misunderstanding our intention—which is not that of suggesting a plan which would supersede the pot-Vine system, but simply to suggest a plan that would supplement it.

The idea of forcing Vines in pits first suggested itself to us on account of our being engaged in weeding out an old place; and it is well known that it would be inevitable ruin to permanent Vines to force them early the second or third year after planting. Pot-Grapes are very good and most useful through the month of April and the early part of the month of May; but after that date they compare badly with produce cut from established Vines.

We would therefore recommend extended root-room for early

Vines, where such space is available, and where the production of early Grapes of good quality is expected and appreciated. The style of forcing-pit which we have used for this purpose is span-roofed, and is 11 feet wide, with a path up the centre—width of bed for soil, $3\frac{1}{2}$ feet, and depth 3 feet, including 6 inches for drainage. A greater depth of bed can easily be secured where it is considered necessary, by sinking the drainage below the path and running a drain up the centre of the bed, with a gradual fall to whichever end there is the best and easiest outlet for a clear watercourse. For our own part, we are content with 6 inches of drainage, and $2\frac{1}{2}$ feet of soil, for a temporary purpose like the one recommended, which is in principle only an extension of the pot-Vine system. Too much rooting space would just be as bad as too little, because, in the former case, Vines are apt to grow too vigorously for the first two or three years. To produce compact, well-coloured bunches, the aim should therefore be to hit upon that degree of extension which, under ordinary careful treatment, would induce such a condition of root-growth as would be favourable to, and promote a moderate and fertile development in, the branches. This is characterised by what is termed short-jointed canes in nurserymen's catalogues; and the condition, whether absent or present, may be ascribed rather to the system of ventilation and atmospheric treatment than to the natural or mechanical nature of the soil.

Vines like obstruction at the root; and resistance is especially desirable in the case we are treating of. Who that has had much to do with the management of Vines has not noticed how, when a young root comes in contact with a piece of brickbat, and its course is impeded, it coils itself round the rubble and breaks up into a number of small hardy fibres, which give real sustenance, increased vitality, and fruiting power to the Vine.

Practice has taught us, in Vine-growing more than in anything else, the conditions which are most favourable in producing temporary or permanent results; and there is no condition more apparent or obviously necessary than that of providing the Vine with feeders which come into play at once when the object is a temporary one. If this be so—and there is abundant proof that it is—in making the border there ought to be a quantity of broken rubble mixed with the soil, and no manurial matter added whatever. The border being made, the next matter to be decided is the selection of such varieties of Grapes as are already tested, and are known to be early in their different kinds and of acknowledged quality. Such a selection would be found in Black Hamburg, Madresfield Court, Duke of Buccleuch, and Foster's Seedling; and if space could be found for

Chasselas Musque, and one or two Frontignans (which are being inquired after, and are soon destined to resume their undoubted position in point of excellence among early Grapes), so much the better.

We have planted Madresfield Court one year, and fruited it the next, on the principle recommended, in company with Black Hamburg and Foster's Seedling, and it carried six handsome bunches which were ready for table in June—the Hamburg being fit for use a month earlier. This Grape deserves a house to itself; and with Duke of Buccleuch along with it, would furnish such Grapes for dessert as would enhance the estimate of early Grapes, and encourage and enlarge the area of early forcing.

With respect to Vines for planting, we would treat the matter on a commercial basis rather than on personal notions. Accommodation is everything, and Vines can be grown too dear where space is limited. Vines that can be purchased from a nurseryman at a reduced price at this season of the year are much cheaper to those who require the space that would be occupied in growing young Vines from eyes. Take a crop of Melons, for instance, a single fruit of which is not to be purchased of any worth much under a guinea before the beginning of June; compare the relative value of each crop, and there is a very handsome margin, commercially speaking, in favour of buying the Vines: but there are others who may think differently, and it is therefore better to take both sides of the question. If the Vines are to be purchased, this should be done some time between November and February. They can be turned out of their pots, which will save something in carriage, and be repotted again after arriving at their destination. This being done, they should be cut down to within two or three eyes of their base, and be kept on the dry side until they are required to be started, say at the beginning of February, when they should be well watered—that is, to moisten all the soil in the pot, and allow it to become mellow in a cool house, before the Vines are excited into action. After the buds break, a thorough watering will need to be given, so as to moisten every particle of soil in the pot; and growth should be advanced as circumstances will permit. In case the Vines are not purchased before the month of March, or even later, it is not a matter of such consequence; only the Vines must not be cut down, but be introduced into heat at once, and be disbudded to the required distance. We have planted Vines from February up to the end of July in the way above described, and all have done well; it is just a matter of choice and circumstances with the cultivator. We never plant Vines except when growing; and of course, for early work, the sooner the Vines are started into growth the sooner will they be ripened and ready for

starting the following year. The border being ready for planting, and its temperature tested with the aid of a ground thermometer, in order that the roots may not receive a check through being planted in soil of a lower temperature than that in which they have been growing, the Vines should be planted at a distance of 3 feet apart, for reasons which shall be referred to towards the end of our remarks.

In planting the Vines, it is important to have all the ball of earth in an equable moist state, so that when it is pricked with a sharp-pointed stick it will mould down in the hands. All that is necessary is to prick the outer surface of the ball of earth and remove the soil on the surface of the ball down to the roots, and disentangle the latter, laying them out at equal distances. Over the bed of soil shake a little fine earth amongst the roots, and press firmly, making the whole bed of soil and the ball of earth of equal firmness.

There is no advantage, but rather the reverse, gained by shaking the balls of earth to pieces, if this important matter is not attended to and skilfully performed. Neither is there much objection to shaking them out if people desire to do so, if the season is not too far advanced, and the Vines have not made too much leaf-growth. After planting, water at a temperature of 85°, and mulch the surface of the border with about an inch deep of horse-droppings.

Vines from eyes for planting in a similar way can either be purchased when about a foot long, or, indeed, at any time up to mid-summer, when it is safe to remove them. If they are grown at home, they should be grown on Mr William Thomson's plan of inserting the eyes in pieces of square turves. A hole is made in the centre of the piece of turf, and a little sharp sand put into it, and the Vine eye pressed down into the sand, leaving the "eye" peeping above the soil.

The turves should be laid on the surface of a bed, with a gentle warmth, and moistened over occasionally with a syringe: this is all the labour necessary for a considerable time, until the eyes calyx at either extremity of their base and emit roots shortly afterwards.

As soon as the roots increase in number, and are travelling over the surface of the turves, a layer of sifted earth should be laid over them: this, of course, will fall away when the turves are separated individually, and leave a healthy mass of roots ready for planting out in the border. We have kept Vines on turves in this way to the end of May, until an early crop of Grapes was cleared from old Vines and a new border made ready for planting. But it is safer when such a case is anticipated to grow the Vines in pots, and plant the ball of earth intact. We have now, as it were, the Vines planted and

growing apace, and as soon as the roots are found to be at work, they should be pinched at a joint or so from the point, and the lateral growth removed from beside the base bud. Some growers allow the rod to travel to the length of 5 or 6 feet, or to its fruiting length, before stopping it; but I always remark that when young Vines are stopped at an early stage of growth, they are supplying themselves with roots during the temporary stand-still, and they rush away with increased vigour afterwards.

During the growing season the roots of the Vines should be liberally supplied with water, and be carefully ventilated. As regards the length between the joints of a Vine, or the breadth or substance of its leaves, it is a matter entirely dependent upon judicious ventilation and atmospheric conditions. If half the Vines in the country got more water at the root, and double the amount of air that they generally get, and about half the amount of atmospheric moisture, I venture to predict that results in the majority of cases would be different from what they are. The fact is, we have got so accustomed to habitual syringing, that we keep Vines growing and extending their shoots long after they would of their own free will settle down to solidify the growth they had made, and plump up their fruiting-buds with the sap that is expended in after-growths and laterals.

As the Vines progress, it will be seen whether they require the assistance of liquid manure at the root; and this should be applied when growth is, so to speak, on the wane, so that the fruiting-buds will benefit by the application, and not the surplus growth that is to be cut away at pruning-time. Ripen off carefully, and remove the sashes, where it is practicable, for a month or six weeks during the autumn. The system would be found to be a great relief where alterations are going on, or to relieve the strain on early houses which are declining in vigour; besides, the Vines—unlike those in pots—will bear two good crops of fruit, and will answer better the second year than the first, as they can be forced earlier the second season.

It is recommended that the Vines should be planted 3 feet apart—for this reason: that a young rod could be worked up from the base of each Vine, so that the cultivator might choose between the rod and the spur system, or arrange matters in such a way as to give both plans a trial. We have tried both ways, and can vouch for either yielding good results.

W. HINDS.



NOTES ON THE CULTURE OF THE PANSY.

POETS have immortalised the Pansy. But the Pansy of the poet and the Pansy of the florist differ somewhat. "The Pansy freaked with jet" is the poet's flower. The subject of these notes is of roundest form, its markings distinctly defined, its "eye" without fault—the Pansy of the florist. Offspring of that of the poet, the Pansy of the florist has inherited the sentimental traditions which cluster round its name. To some it is known simply as "heart's-ease;" to their ears "Pansy" is a meaningless sound. To many, the simple seedling forms, flourishing in lowly beauty, give as much pleasure in the mass of blooms they individually bear as would the more refined sorts. And, moreover, the finer-named sorts make a call on the time and attention which a large class of amateur gardeners do not care to meet. From the prominent position the florist-flower section occupies in the business of seedsmen, the number of Pansies, as also of other florist-flowers cultivated from seed, must be considerable, and consequently prove a means of no slight value for encouraging a love for flowers. It is, of course, of the first importance to secure a supply of seed from a good strain and a reliable source; but having got so far, the best means of raising a healthy lot of plants is of almost as much importance. Believing this, the directions for propagating plants from seed are made full and plain; and although referring particularly to the seed-bed being in the open, the advantage of a cold frame may be taken where such can be had. As the young plants need not be removed from the seed-bed till the spring after sowing, a sheltered position should be chosen for the bed. Provided the soil is in ordinary good condition, all that will be necessary to do by way of preparing the bed will be met by pointing in a dressing of dry decayed manure of an open nature. If the weather is drouthy, and water required, apply the water in the morning, and after noon sow the seed. The seed requires to be very thinly scattered over the bed, in order to secure plenty of space for the growth of the young plants. Cover the seeds with a very thin sprinkling of fine soil, then tread the bed over moderately firm. These measures will do much to produce a dwarf and slow growth in the plants, calculated to stand the changes of winter with impunity; and in spring lift with balls of netted root-work. But we must return to the bed, and finish there. Directions have been given as to moistening the soil in case of dryness. Now, as a means of keeping the soil in an equable state of moisture, cover the bed with mats or other suitable material. With this precaution, no further watering will be required, and the seeds will in due time germinate, when the coverings will be no longer necessary. August is a good time to sow; and the following February the plants will be ready to transplant into their flowering positions. In June they will commence to flower, and, under good cultivation, will continue flowering till stopped by inclement weather. Seedlings may be also

successfully raised in spring. I use boxes filled with a rich open compost for this season, and place them in a structure where a mild heat is kept up. When sufficiently strong they are pricked off into other boxes, and kept growing till, in April, they are finally planted out. These bloom later than those treated as biennials, but do equally well in other respects.

With regard to the propagation of named sorts from slips with or without roots, the enthusiastic florist who desires a continuous supply of first-rate blooms, must, with an alteration of terms suitable to the circumstances, appropriate to himself the laird's advice to his son, and be "aye stickin' in" cuttings. And just a word as to the best kind of cuttings. I like them about 2 inches in length, and stocky. These are much better root-producers, and make better plants than those of much greater length. Plants to flower early in the year should be propagated early in autumn, and planted out about the end of September. Another batch of cuttings taken in the beginning of October will be ready for planting in February following, and will succeed the first-mentioned lot. To succeed these, another batch of cuttings must be struck in spring—this time in a frame; and yet another strike is required for a late bloom. These should be selected with roots attached, and pricked into very rich root-producing soil. Growers not so anxious to keep a stock of young blooming plants going should propagate in October, and plant out in February, when, with a little attention to the plants in removing seed-capsules, and keeping a thin supply of young growths, with the necessary cultivation of course, a continuous supply of flowers will be had to the end of the season.

Pansies flourish in all kinds of soil; but in order to have them at their best, the Pansy fancier—"Amateur," a Frenchman would designate him—will be at some trouble to gain that end. In some soils it will be unnecessary to do more than dig in a rich dressing; but in soils of a poor nature more pains must be taken in preparing the bed. I would recommend the ground to be deeply trenched in autumn; at the same time working in a liberal dressing of manure whilst the trenching is proceeded with. In spring, 4 inches of the surface-soil should be thrown out, and a compost of fresh loam, decayed manure, and soot thrown into its place, and mixed with the natural soil to the depth of 9 inches. A mulching of spent mushroom-dung, with a little soot added, should be applied to the surface of the soil immediately the plants have been got into their places. Twelve by fifteen inches is a good distance to set out the plants.

Where particularly fine blooms are desired, there is no better plan than I have seen followed by growers in Berwickshire. They have a set of open frames, which are filled with a compost in which the plants are grown; and they have the plants, therefore, entirely under control. Where slugs abound, a gutter is run round the frame, and kept always full of water. Blooms for exhibition should be shaded seven or eight

days before the day of show. Some growers cut the blooms the night before they are wanted. The tubes for holding the flowers are made of a particular shape, to suit the conformation of the spur and calyx, and the angle at which the flower lies from the stem.

The "fancy" kinds have now been brought to such a high state of perfection, and are, withal, such free and continuous bloomers, that, to the general lover of flowers, I would strongly recommend these in preference to the older, though perhaps more refined, "show" varieties, making an exception of some of the "self"-coloured flowers in that section, which are very well worth growing alongside the "fancy" varieties. Of course I have no objection myself to the various sections of show sorts—growing, as I do, a large selection of them; but to that great body of florists unconcerned about the nice little points which to the *real* florist make up the qualities of a flower, there is a far greater amount of pleasure to be got out of the sections recommended than if "show" sorts were added. To all who love and grow flowers I would offer this advice: Add the Pansies to the list of your favourites as soon as possible, if you have not already done so, giving your nurseryman leave to select the kind you require, and you will be highly gratified with this addition to your floral friends.

R. P. BROTHERSTON.



THREE NEW ORCHIDS.

AMONG the many new and rare plants exhibited for the first time at the meetings of the Royal Horticultural Society at South Kensington during the past year, were the following Orchids: *Dendrobium superbiens*, *Calanthe Sedenii*, and *Lælia anceps alba*—all alike being unanimously awarded first-class certificates by the Committee. They are perfectly distinct (the first and last more especially) from any known variety of the species or genus to which they respectively belong; and what is of primary importance, can easily be grown by a mere tyro in Orchid culture, and must eventually become very popular.

Dendrobium superbiens was exhibited by Mr B. S. Williams, on 15th January, and was at once pronounced to be of great sterling worth. It is of the *D. bigibbum* type, but is totally distinct from it. The growth is upright and cane-like,—when well grown, fully 4 feet in length. The gracefully drooping floral spikes—borne near the summit of the growth—consist in some instances of from twelve to sixteen flowers, the prevailing colour of which is a rich mauve. There may be said to be several varieties of it, the colour of some being of a rosy purple, others rosy lilac, and the petals sometimes faintly "wired" with white. A very remarkable quality it possesses,

is the extraordinary duration of bloom, which lasts fully three months, and sometimes still longer. Being a native of Australia, it does not require a high temperature at any time, very little skill being required to grow it to perfection. Mr Bull has a splendid display of this grand mid-winter flowering Orchid.

Calanthe Sedenii, exhibited by the Messrs Veitch on 19th November, is a hybrid raised by that firm, and is the result of a cross between *C. vestita* and *C. Veitchii*. It is of vigorous growth, the spike strong and gracefully curved; and the flowers, larger and richer than any of the species, are of a deep rose, tinged with magenta, increasing in intensity as they age to a still deeper tinge, and margined with white in the throat. With this variety, Messrs Veitch exhibited spikes of *C. Veitchii*, and the contrast afforded abundant proof of the decided superiority of *C. Sedenii*, and which may be fairly considered a great acquisition to this extremely useful class of plants.

Lælia anceps alba is a nearly pure white var., the only exception being a yellow blotch in the throat. The flower in other respects closely resembles *L. anceps*, but the pseudo-bulbs and leaves are smaller. It is a native of Mexico, and plants of it were found growing on precipitous rocks at an altitude of 8000 feet above the sea-level, where, as can be imagined, the cold is oftentimes intense. It might not inaptly be termed one of the coolest of cool Orchids; it certainly is one of the brightest gems to be found under this classification.

A SOUTHERN CORRESPONDENT.



HARDY FRUITS.

THE ground in which fruit-trees are growing might, with advantage, be tested as to the state of its drainage. This remark may apply more to orchards than gardens: the coating of moss over the bark of so many trees, and the stunted wood, with dead and dying points, seen in so many orchards, show clearly where the fault is. After floods, one may notice how long the water is in disappearing from the surface, and how difficult it is to perform the work of pruning during the winter months by the quagmire-like soil of the orchard. It is labour well spent to drain such places, and it can be done without materially damaging the roots—drains running across the ground about 20 to 25 yards apart, emptying themselves with a fall into a main drain, which should descend to ground of a lower level, running clear from the roots of all trees. We had to deal with an orchard and plantation some time ago, which were ruined by allowing ditches to become stopped; the trees have been dying for years, when a little alteration of the ditches would have saved them.

When there are arrears in pruning, planting, or any other operation, it would be well to make every effort to overtake what has been lost ; better do the work "late than never." Get all pruning finished. Peaches and Nectarines which are left to the last should be finished as early as circumstances will allow ; as they bear on the wood formed last year, a number of the best placed shoots should be left. Regularity and neatness are objects of greater moment towards fine crops than some seem to recognise. It is seldom one sees Peaches trained in a systematic manner, so that from 10 inches from the ground to the top of the wall regular supplies of fine fruit may be had. Wherever there are gross shoots they may be cut out, as such wood never becomes fruitful. Protection for these and other trees by nets, tiffany, and other makeshifts should be put on. The most important part of this protection is to keep the trees back as much as possible, so that the flower-buds open late, and in a measure escape frosts. Placing the protection at night and pulling it up during the day often does more harm than good : strong sunshine is so likely to excite the buds they are better partially shaded during the day. We have seen so little advantage—even to those who advocate flimsy protection—that we doubt if it pays for half the labour. When trees are all fastened to the walls, and before the flowers open, it may be well to give a syringing of Ghishurst Compound all over the trees at intervals of several days—tobacco powder, sulphur, and soap-suds does very well ; this often acts as a prevention to insects taking up their quarters on the trees, and coming out in strong force during summer. Figs may be uncovered by degrees, but some branches of Spruce or Laurel may be left on for some time to come. "Sudden excitement" means "sudden destruction." It may be necessary to look over some of the early Plums and Apricots with a view to disbudding them. All the shoots coming right out from the trees may be rubbed off as a beginning. Clearing off young growths (as the foliage begins to expand) in a wholesale manner does not only check the functions of the tree, but causes fruit to drop, and exposes it to frost and destructive winds. With young trees, and where no fruit-buds are on the shoots, we prefer going over the trees, picking out the wood-buds as soon as they begin to move into growth, leaving those placed on the leading shoots which are likely to fit closely to the walls ; any leading shoots tending to become gross are stopped at every few joints to give the wood lower on the tree an opportunity of improving. Where wires are used in preference to tying the branches to nails, or the older system of using shreds of cloth, it is well, while the necessary attentions are paid to the developing of the growths, that the branches are not allowed to rest on the wires tightly, or be tied too close to them. Those unacquainted with the method of dealing successfully with wires often allow mischief to be done to the wood and bark, and then wiring is denounced. Double the girth of the wood should be used in each tie to

allow room for swelling ; sharp twine, and similar dangerous material, should be avoided for tying purposes.

“Examples of Wiring,” in a contemporary, have been given by Mr Sheppard of Wolverston (one of the most successful gardeners we are acquainted with) ; and the crossing of the wires, as given according to the plan of Mr S., is a system superior to our own in every sense, though we are greatly pleased with the latter—the first expense is so small for wiring—and its being permanent is more economical than the untidy method of drawing nails, &c. The elasticity of the wire now commonly used fits closely and tightly to the walls, so that the shoots may be safe from draughts of cold air passing between them and the walls, which seem to have perplexed divers cultivators. Where mulching, staking, and firming the soil to roots of newly-planted trees remain undone, let such important work have attention as soon as the soil is dry on the surface. Gooseberries, Currants, and Raspberries still unpruned may be pruned as early as possible. The system of leaving these late, to make up for the mischief done by birds, is, we think, a questionable practice, and we have never patronised it much. A wash of cow-manure, lime, and soot we never saw fail in keeping the feathered tribe at bay, when painted over the branches or syringed on them. When Gooseberries are pruned, the most upright-growing shoots should be retained where they are required, spurring closely to the main branches, always removing any stunted old shoots when healthy young ones are there to take their place. The same remarks may be applied to Red and White Currants ; but they remain longer in vigour when spurred than Gooseberries. We have rejuvenated many Currant bushes by introduction of new wood when they have been doomed to the fire. Lifting Currants and Gooseberries is a good practice ; mulching thickly over their roots when all suckers are cleared away brings the feeders near to the surface ; a reduction of watery growths and finer fruit are the result. The lifting also reduces the evil of bushes dying off suddenly. Black Currants simply require thinning regularly, leaving the centres rather open ; topping any shoots growing too high, or what is better, cutting them out, leaving straight sturdy growths to take their place as leaders. When pruning Rasps, leave from four to six of the best canes to a stool ; they may be trained over as arches, tied to upright stakes, or, what we prefer to any system, training them in rows to several lines of wire placed horizontally, strongly fastened to oaken or iron uprights. A thick coating of manure placed over the roots of Rasps is of great advantage to them. Their natural position in a wild state is in shady bog-lands, where they are cool at root. Cuttings of Gooseberries and Currants, to keep up a stock, may now be made and planted. About 15 inches of strong wood, with top cut off and three eyes left, is a good useful size. All buds but those at top are picked off with knife and cut clean below a joint at base. They should be planted in rows firmly. Strawberries may be top-dressed

with half-rotted manure. Some put on manure of a littery character, and allow it to wash clean preparatory for the fruit. We think a little clean straw preferable when placed just as the fruit is set.

In the orchard-house active measures to get the trees ready for fruiting should be taken, so that when buds are advanced they may not be in danger of being knocked off. Clear all inert soil from the surface of the roots. Put drainage right. Wash the pots, and surface with healthy loam, three parts, one part of cow-manure, and a portion of bone-meal mixed with the compost; a little coarse sand allows the water to percolate freely when mixed in the surface-soil. Arrange the trees according to their kinds and heights; avoid crowding, and let the trees start gradually. If they have been plunged in ashes during the winter outside, it would be forcing to place them now in more than a greenhouse temperature with plenty of air. As the blooms open, give air carefully when winds are frosty. On front ventilators a screen of tiffany or some other wired breaker may be nailed. Trees under glass cannot stand in cold what they would on walls or other exposure. Have the house and trees always dry at night till nights are warm and sun has power. Water with care at first; and when foliage and wood are expanding freely, let the roots have larger supplies of moisture. When fruit is swelling, and roots have filled the pots, give guano-water at each time of watering—just sufficient quantity to colour the water. We prefer this to heavier doses at longer intervals. Do not allow the surfaces to become battered. The same advice applies to trees planted out—a system we much prefer to pots; and by lifting a portion of the trees every year, and turning them round to the light, they are easily kept to a dwarf size—healthy and vigorous. M. T.



NOTES FROM THE PAPERS.

THE French, we all know, are adepts at rearing and managing trees; but if we are to believe an able writer on “French Forestry at the Paris Exhibition,” in the ‘Journal of Forestry,’ the Frenchman does not entertain that *respect* and veneration for fine trees which we do in England: and the consequences are, it appears, very noticeable in their parks and gardens, which are comparatively destitute of old and noble trees.

The wealthy Englishman lives out of town, if he can; but the wealthy Frenchman lives in the city by preference, and in Paris if possible, and eschews cricket and other manly games, field-sports, and the like, and turns his attention to dice, dominoes, and frivolity; and hence, observes the writer just mentioned, there is a general neglect of the country, and, consequently, of the objects of the country—“hence their unfortunate specimens of gardens in the ‘natural’ style, and of parks. Trees share in this neglect, and speaking as a general rule, they are looked upon even by the more refined part of the community as any other crop is looked upon—*i.e.*, for use, and in no way for ornament. Hear the complaints of a French gentleman—Baron Marochetti—as

reported in one of the late Mr Senior's conversations. Mr Senior had been admiring the Baron's park at Vaux, where he was staying, but remarked on the absence of fine trees. His guest answered, 'It is impossible to persuade a Frenchman that trees are anything but a source of profit. My intendant values them according to their cubic contents. As soon as my back is turned he finds an excuse to cut down every one which he thinks has reached its maturity, for sale; so does every one else. There are more fine trees in Hyde Park and Kensington Gardens than in all France.' If, therefore, the mass of the French people do not value trees as an ornament, and few have the means of cultivating them for profit, it follows of course that but a small part of the community will know anything about them. Contrast this with the state of things in our own country, where every one is anxious to surround his dwelling with trees, if they are not already there, and to learn a little at any rate as to their management."

A discussion which has been going on lately in the same paper sheds some light upon that humdrum body, the Scottish Arboricultural Society. One who seems to know something of the Society compares it to "a strong man fast asleep," and draws a somewhat amusing picture of its doings. It is asserted that competitive essays, upon arboricultural subjects, have been sent into the Society, and been awarded high premiums, that have afterwards, "for some inscrutable reason, been consigned to the depths of oblivion" instead of being published in the 'Transactions,' as they ought to be. It is hinted, however, that possibly the gentleman appointed to judge the essays and the "publishing committee" may have differed in opinion as to the merits of the papers sent in, and pleased themselves, accordingly, as to what should be done with them. It does seem a little queer, however, that the Scottish Arboricultural Society should give premiums to essays which it afterwards sends to the waste-paper basket. Another member of the Society, Mr France, who describes himself as "a member and councillor of some years' standing," endeavours to explain the apparently amicable relationship thus existing among the different sections of the Society, by stating that, "while certain awards may be granted by the judges as an encouragement to young or inexperienced writers to persevere and improve themselves," the publication of the papers may be a question of their "practical worth;" from which it can only be inferred that one of the objects of the Scottish Arboricultural Society, in offering premiums for papers on practical forestry, is to teach "reading, writing, and arithmetic;" and we may assume that pupils who have passed in the "three Rs" will then be further encouraged by the prospect of their papers being printed. Really one cannot sufficiently admire the energy and enterprise of an already over-burdened Society like the Scottish Arboricultural Society charging itself with such a task, and surely there can be no tendency to go to sleep under such circumstances.

A recent feature of your contemporary, 'The Garden,' is its excellent articles on "Plant-culture for Market," which cannot fail to be acceptable to its gardening readers. Gardeners who visit Covent Garden for the first time are impressed, not more by the extent of the supply of decorative plants in pots than they are by the superiority of the plants themselves. It may be safely asserted, we think, that the plants exposed for sale in Covent Garden are, as a rule, much superior to those of the same kind usually grown in private gardens for similar purposes, and also that they are grown more cheaply and expeditiously, as might be expected; for the market growers confine themselves to specialities, and spare no pains to do them well. Their methods of culture may

be rougher and readier, but they are effective ; and these 'The Garden' endeavours to explain in as succinct a manner as possible. Nothing more practical or instructive has appeared in the horticultural journals for a long while, and we commend the papers to those who wish to be posted up in what is now an important branch of the gardener's business. It may not be generally known to gardeners that these exceedingly well-grown little plants of *Erica hyemalis*, *gracilis*, *Willmoreana*, and others, which we see towards the end of the season for sale in nurseries, are very often Covent Garden plants, or, at least, from the growers for Covent Garden ; and the following account of their propagation and management from 'The Garden,' may interest your readers:—

“Probably as large quantities of Heaths are disposed of about London as of any other kind of plant. One grower alone sells yearly 200,000 plants, and I believe some grow even more than that number. The large houses devoted to Heath cuttings in some nurseries during winter are alone a sight worth going miles to see. Here, on stair-like stages, are thousands of 6-inch pots, each containing some fifty cuttings, covered with small bell-glasses. In sheds adjoining may be seen men making cuttings with pairs of scissors, and others deftly inserting them in the pots, which are surfaced with finely-sifted silver sand ; others, again, are watering and setting the pots in their places and putting on the bell-glasses, whilst others are removing such as are already rooted to make room for those that are newly inserted. More men may be seen out in the grounds busily nipping off the points of young plants which are growing on in cold pits for the next year's blooming ; and so the production of young Heaths goes on from year to year. About Christmas time the markets are crammed with little bushy plants of the rosy-coloured *Erica gracilis* and the pearly, rose-tinted, waxy-blossomed *E. hiemalis*, two of the principal varieties grown for winter and spring blooming. These are succeeded by *E. Willmoreana* and *E. candidissima*, and after these come the beautiful *E. ventricosa* and the yellow *E. Cavendishii*. Cuttings of these *Ericas* are struck on a very slight bottom-heat during the winter months, or as soon as cuttings of them can be obtained. When rooted, they are potted off, three in a 3-inch pot, and placed in light, airy situations, such as on shelves of houses or in lean-to pits close to the glass. During March they are shifted singly into 3-inch pots, and, when well-rooted, they are placed in cold pits and subjected to as much light, air, and sun as possible ; in this state they remain throughout the summer, receiving abundance of water both overhead and at the roots. In the following winter they are cut back, and as soon as they again break into fresh growth they receive their final shift into 5-inch pots, extra large plants being potted in 6-inch ones. Pure peat and sand constitute the kind of soil used for them ; and they appear to enjoy it, for Heaths may be seen in some nurseries growing as freely as scarlet *Pelargoniums*. Fire-heat is as much as possible at all times avoided ; and in very severe weather, mats, &c., are used to keep the plants at a proper temperature in preference to heat from hot-water pipes.”

The 'Gardeners' Chronicle' is anxious that none of its leading or other articles be borrowed or stolen “without acknowledgment,” to perpetrate an Irishism. We hasten, therefore, to say that the following original hypothesis is from its pages, and is shared by no one else, we believe. Your contemporary is concerned to prove that bottom-heat is unnecessary in plant-culture—why it does not matter, and it proves its case thus : “The earth absorbs heat slowly through the greater or less amount of *stagnant air* in its open surface, its warming powers being still further retarded by the natural disinclination

of heat to descend, consequently it does not regain the heat it has lost during the period of the lowering of the temperature of the air nearly so quickly as the air is warmed by the sun's increasing force; therefore the above-ground parts of plants are placed under the growth-exciting influence of heat continually in advance and excess of the roots, until the turning period has arrived in the pot season, when the force of the sun begins to come, &c.;" and, continues the writer, "I would recommend those who look upon bottom-heat as indispensable to the successful cultivation of plants from hot countries, to consider this fact; and, I think, they cannot fail to see that applying it (bottom-heat) as is ordinarily done at the commencement of the forcing season, in a volume equal to or often considerably above that in which the heads of the plants are placed, is diametrically opposed to the conditions under which they are found in a state of Proteus, when the earth's heat is in excess of that of the air, only at that time the season's growth is being matured." "Fail to see!" We should think not, after such a perfectly lucid and convincing argument as this. The "stagnant air" in the "upper surface" of the earth is an obstruction we did not calculate upon before; and the said upper surface argues an "under" surface somewhere, which is just a little puzzling, but all the rest is perfectly clear. We know you do not believe the statements here made about the temperature of the earth, Mr Editor, and no doubt you could tell us to keep our eyes open, and look at the thermometer, &c.; but, sir, you have preconceived opinions, and are unreasonable. Such problems, we would respectfully inform you, are not now settled by the thermometer, nor yet by the eyes, nor any of the senses; they are decided, sir, upon the *ratiocinative principle* alone, and of which we have just furnished you with such a beautiful example in the above extract. By this method you do not need to trouble yourself with experiments and observations; you can demonstrate any problem in nature without leaving your easy-chair, as we are about to demonstrate now, that your contemporary is not only quite correct respecting the temperature of the earth, &c., but that the heat of the sun never reaches this earth at all. The "stagnant" air and other obstacles which obstruct the sun's heat, are nothing to some others that the writer in 'The Chronicle' might have cited. For example, there is the stagnant air in the surface of the sun itself—we like to start with a good solid assumption; next, there is the 90,000 odd miles of luminous atmosphere; outside of that the "sun spots," which have been troublesome lately; and beyond all, the 95,000,000 of miles to be traversed before the sun's heat could reach this earth, not to speak of the "stagnant air" and other things. Now, sir, here are four great sources of obstruction sufficient to stop all the heat that ever was evolved out of matter since the beginning. "It follows, therefore," as your contemporary puts it, and as we have satisfactorily demonstrated, that there is no such thing as sun heat; and if plant cultivators would only "consider this fact," they would adapt their practices accordingly.

It was to be expected that the introduction of the St Michael's Pine-apples to our market would have a sensible effect upon prices of home-grown Pines and Pine culture in this country; but another and rather unlooked-for effect of the plentiful supply of the St Michael's fruits is a reduction of the price of Grapes also, and just at a season when these are most remunerative to the English growers. Fruit-sellers, it appears, are discovering that their middle-class and most numerous customers, finding the imported Pines excellent and acceptable dessert fruits, and at the same time cheap, are buying Pines in preference to Grapes. Probably the bad times have something to do with it

as well; but when talking the matter over lately with a fruit-dealer in a large way, he told us that while his sale of Pine-apples had doubled or trebled, the sale of Grapes had fallen off proportionally, and that fruit-sellers were cautious in buying the latter, except to meet special orders.

That leading article in the 'Gardeners' Chronicle' (whose misfortune it is to have to discuss practical questions in their scientific aspect), on M. Alberto Levy's investigations regarding the influence of light on the ripening of Grapes, strikes one as containing some rather trite observations on the subject. It is addressed to gardeners, but there is nothing in it that they may not read in gardening calendars every day. "A little nonsense now and then" is not objectionable; but when a paper fills its leading columns one week with the ramblings of persons whose dogmatic conceit and intolerance is only equalled by their inexcusable ignorance of the subjects with which they attempt to deal, and the next with matter that is absolutely stale, it becomes a trifle disappointing. Upon M. Levy's experiments and operations we need offer little comment, except that most of the conclusions drawn from the first are long foregone. His main object, we are told, "is to ascertain what is the principal agent which determines the degree of acidity in ripe Grapes, under equal conditions of soil and altitude," &c.; or, in other and non-scientific parlance, as the reader gathers from your contemporary—whether sweetness or sourness—a good or a bad flavour is "determined" by a good or a bad season, as these terms are understood; and after discussing the subject at some length, your contemporary observes: "To the botanist it matters little that the Grapes are sour or sweet—the Grapes are ripe in a botanical sense when the seed is formed and in a fit state to germinate. But for the cultivator the Grapes cannot be considered ripe until the constituents of the fruit have become so adjusted as to produce Grapes of the best quality for the table or for vintage purposes. Botanists and physiologists have, to some extent, ignored this latter class of changes, which, nevertheless, are all-important to the cultivator, and to them the attention of chemists and physicists should be drawn." Thus, you perceive, botanists and physiologists, chemists and physicists, who are here satisfactorily distinguished from the "cultivator" or gardener, will tell the latter something by-and-by on the subject of ripening Grapes—when they have time to look into the matter—and *then* what productions will appear on the dessert-table! The main conclusions arrived at by your contemporary, in the meantime, are that "heat and moisture (alone) are incapable" of ripening Grapes perfectly, and that "light alone can give us the key to the solution of the problem;" also that "the quality of the fruit as it hangs on the vine depends on the combined action of heat and light during ripening." From these conclusions the Grape-grower may infer three things with tolerable certainty: first, that the sun shines in those countries where the Grape comes to perfection; secondly, that it would be almost hopeless to attempt to ripen Grapes under any other than a glass roof in this country; thirdly, that the heat and the light, when they are "combined," must have some reasonable proportion to each other. Unless we altogether misapprehend your contemporary, we think this is what it intends to convey on the subject of Grape culture. As to its statement that "abundant crops succeed to," or are "insured by, dry, bright springs," we shall probably learn more when the "botanists" and the "physicists," &c., have finished their investigations on the subject; but it may just be stated that, meanwhile, gardeners are under the delusion that good crops only succeed favourable autumns that ripen the wood and buds of the Vine, and that the spring season, be it favour-

able or otherwise, has nothing whatever to do with it, let alone insuring the crops.

Your contemporary hopes that at some future period—about the millennium probably—when plants have ceased to require nocturnal rest, they will be forced under the influence of electric light when the sun goes down. Gardeners will then hang out their lanterns, which will at least have the effect of scaring cockroaches and their fraternity. How far M. Lévy and the ‘Gardeners’ Chronicle’ are clear on the subject with which they deal may be gathered from their suspicions as set forth in the following ‘lucid passage’: “The expressions, ‘clear,’ ‘cloudy,’ ‘overcast,’ and the like, are much too vague, and too much dependent on personal observation, often defective, and almost useless for purposes of comparison. *Nevertheless, by means of observations of this kind co-related with the indications of the thermometer for the same period, M. Lévy is led to suspect the existence of a certain co-relation between the influence of certain meteorological agents and the preponderance of certain ingredients in the Grape.*” The author of this passage appears to be as hopeful as the schoolboy who chased the three corn-crakes, observing as he ran, “if he could only catch the first ane and anither ane, he would only ‘want ane.’”

That discussion in the ‘Chronicle’ as to whether Mr D. T. Fish acted “rationally” or “irrationally” in adopting the “pendulum system” of Grape-culture, as described by him in his article on tendrils some time ago, is an awful warning to those who are disposed to be nice or inquisitive about the meaning of words and phrases. To be told that one acts “irrationally” is bad enough, but to have it demonstrated to one in calm unanswerable logic is “tew much.” If we couldn’t speak we’d kick out. We regard Mr W. Thomson’s contribution to the discussion as an indignant attempt on his part to shake the testimony of an important witness of the Culford Sport; and we are afraid that Mr Fish is quite a little ashamed of the pendulums now, though he once thought he was communicating a rather noteworthy discovery to Grape-growers. Mr Fish would have us believe now that he only used the pendulums once or so in an emergency, and when the most sensible course under the circumstances was to deal with the effect instead of losing time hunting for the cause. All very well, Mr Fish! The reply may be sufficient for those who, like Mr Thomson, quoted from memory, and whom it might be happily supposed had not the back numbers of the paper to refer to; but did you not tell us that you had adopted the plan “*many times during twenty years*”? Had you quite forgotten a practice that you had so recently advocated, and so long carried on yourself? and was there no time during the reasonable period of nearly a quarter of a century to look into your Vine-borders and deal with the cause? The simile of the broken leg is an unfortunate one. He certainly would be a foolish fellow who declined to use the readiest means to mend his limb when it *was* broken; but what name have we for the man who, having good reason to suppose that the same accident would happen to him every year for twenty years, through the same cause, took no means to avert it?

READER.

— P u b l i s h e d —

ORNAMENTAL TREES AND SHRUBS

HIBISCUS SYRIACUS (THE SYRIAN HIBISCUS).

THIS is one of a large and very varied genus, consisting of evergreen and deciduous trees and shrubs, along with a considerable number of herbaceous plants and annuals. The various species are found distributed over the tropical and temperate regions of both the old and new worlds. All the sorts have handsome foliage and showy flowers, and some, such as the grand *H. roseus sinensis* with its fine varieties, with single and double flowers, are among the most valued ornaments of our stoves and greenhouses. With the exception, however, of the one which forms the subject of this paper, the ligneous species are too tender for our climate in the open air. As its specific name implies, it is indigenous to Syria, but it is also found more or less abundantly in several of the surrounding countries, growing in high mountain valleys, and forming an amply branched bush with a somewhat upright habit of growth, of from 8 to 10 feet in height. It was formerly associated with the Hollyhocks and Mallows in the genus *Althæa*, and is still known under the name of *Althæa frutex* or "Shrubby Hollyhock." It has been cultivated in British gardens since 1596. The leaves are of a light-green tint, ovate in outline, serrated, and distinctly three-lobed. The pretty bell-shaped purple flowers are borne on long footstalks from the sides of the young branches, and begin to expand early in September.

The Syrian Hibiscus, though now little known, and comparatively seldom met with, is one of the finest of our hardy deciduous flowering shrubs, of free growth in any rich deep soil, and hardy enough for the open shrubbery border. It is found, however, to flower best when enjoying the protection of a sunny wall, a position for which it is well adapted, notwithstanding the absence of foliage in winter, a defect to some extent compensated for by its rich autumnal beauty, while its smooth whitish bark forms quite a feature after the decay of the leaves.

It is found to grow well in the smoke and dust of towns, and might with advantage be introduced into our squares and parks much more extensively than it has been hitherto.

Of a large number of varieties, the following are the most attractive: they are all equally hardy with the parent, and in some cases more beautiful, so far as flowers are concerned.

Var. *alba*—flowers pure white.

„ *ardens*—bright violet.

„ *azurea plena*—double blue.

„ *cærulea plena*—double dark blue.

- Var. *elegantissima*—blue and purple.
,, *fastuosa*—bright rose.
,, *grandiflora*—large red.
,, *purpurea variegata*—purple, with silvery variegated leaves.
,, *purpurea plena*—double reddish purple.
,, *speciosa plena*—double white, purple striped.
,, *violacea plena*—double violet.

HUGH FRASER.



GRAFTING AND MANAGEMENT OF TEA ROSES.

AMONGST sweet-scented flowers, nothing is more appreciated or gives greater pleasure and satisfaction than a few Tea Rose buds in the winter and spring. The season is fast coming upon us when plants for the supply of flowers next winter and spring should be increased and prepared, which can be done either by striking the cuttings from half-ripened wood in a gentle bottom-heat, or by grafting on the Manetti stock. Of course plants can be purchased for a very small outlay as soon as they are struck or grafted, and grown on; but my remarks are intended for those who wish to increase the stock without purchasing.

It would be superfluous to refer to the mode of striking the Manetti for stocks, which is so easily accomplished if cut in lengths of 9 or 10 inches, and inserted into the ground: nearly every one will strike. It is useless to waste time in preparing the stocks, as a quantity can be purchased at little cost, rooted and ready for potting. Supposing the stocks are rooted, they are best potted during the winter and plunged outdoors,—cutting the roots well in, so that they can be potted into 2-inch pots, using loam and sand, and a little well-decomposed manure, at the same time shortening back the growths on the top of the stock.

The stocks will be ready for grafting in March, or earlier, if placed in a cool house or frame, provided they have made roots sufficient in their pots by that time, and the wood for grafting is ready, which should be half ripened. It is therefore necessary that a batch of plants be started into growth early, from which the grafts are to be taken. If the stocks have not been potted in early winter, they should be potted at once, and placed in a frame to commence growing, instead of being placed outside. When sufficient young roots are made, and the sap is flowing freely, the operation can be performed.

The best system of grafting is that known as tongue-grafting, as the operator can use a stock of very slender dimensions. In performing the work, the stock can be cut off within 2 inches of the soil, and a notched slice should be cut through the bark of the stock about $\frac{3}{4}$ of an inch in length, against which the cut portion of the graft should be fitted, and made secure with a small bass tie, and then well rubbed over with grafting wax or clay,—either will answer the purpose.

After this portion of the work is completed, these grafted plants should be placed where the temperature can be kept at 60°. They are best in a close frame in the propagating-house, or under hand-lights, where they can receive a little bottom-heat, if possible, which assists them to unite more quickly. I have been very successful with them placed in a vinery with the above temperature, and without any bottom-heat, although they are longer before taking to the stock. They require to be kept moist at the roots, and well syringed until the grafts have properly taken, and shaded from strong sun. When the grafts are well united to the stock, growth will soon commence rapidly; and care must be exercised that the frame is not kept too close to cause the growth to be weakly. As soon as 4 inches of growth is made, they should be transferred from the small into 5-inch pots, using the same compost. In this size the scion can be buried in potting underneath the soil, which is advisable. By adopting this method, young roots are soon thrown out from the place where they are worked, and in due time they will be on their own roots independent of the stock. The position now suitable for the plants is a low pit with a hot-water pipe in it, where the desired temperature can be kept, and air admitted on favourable occasions to strengthen the young shoots as they develop. They should still be shaded from strong sun. It is advisable to keep the pit close for ten days or a fortnight after potting, until they have taken to the new soil. The plants will still receive much benefit from a little bottom-heat, if it can be given them, and the cultivator will soon see a great difference in the plants over those that are on a cold surface.

The potting must be attended to as the plants require it, until they are put into 9-inch pots, which size we consider large enough the first season. If the plants have a suitable pit devoted to them, and a gentle bottom-heat until the external atmosphere is sufficiently warm to render artificial heat unnecessary, the young shoots will grow apace. The flower-buds should be picked off as they appear, and the plants fumigated at the first appearance of greenfly. When the external atmosphere will allow, the plants must be grown under more airy conditions. Such varieties as Gloire de Dijon and Maréchal Niel, &c., will make tremendous shoots by the end of the season, which should not be stopped, but should be well ripened in the autumn, and in early spring they will produce a flower from nearly every bud along the shoot. I have seen from a Maréchal Niel, grafted in March, forty flowers the following spring, although the plants were planted out in a prepared border at the end of June,—consequently the plant grew more rapidly than it would have done in a pot.

I might say that this variety (Maréchal Niel), according to my experience, refuses to do well upon the Manetti for a stock: it soon dies off. Such has been my experience. It will succeed well the first year, and then the stock appears to die. It should be potted or planted as

deeply as possible to get it on its own roots; or, worked on the seedling briar, it appears to do very well.

Such varieties as *Niphetos*, *Isabella Sprunt*, *Rubens*, *Madame Falcot*, *Devoniensis*, *Safrano*, and other varieties too numerous to mention, grow more bushy than the above two; and if grown coolly in the latter part of the summer up to October, and then placed into a temperature of 55°, they will soon commence and continue to flower more or less through the whole winter, well repaying the cultivator for the trouble bestowed upon them.

There is nothing better than Ewing's Infallible Composition if the plants are affected with mildew.

WM. BARDNEY.



VIOLETS FOR WINTER FLOWERING.

THE importance of a supply of Violets in winter, and the universal esteem in which they are held for the pleasant odour they impart to rooms where flowers are admissible, as well as their general utility for a variety of other purposes, render their cultivation an object of ambition to all who are engaged in horticultural pursuits. Small bouquets of Violets are things that the most fastidious in taste never tire of, either in season or out of season; they are especial favourites with ladies when neatly arranged and surrounded with a few of their own bright green leaves; and they are also becoming fashionable for filling small glasses on the dinner-table, whilst they are highly prized in many places as pot-plants for the conservatory.

There are different ways of preparing plants for winter flowering in pots, any of which appear an easy method of cultivation on paper; but Violets, like most other plants, inherit their likes and dislikes to certain soils, situations, and localities. This fact is not, I fear, sufficiently recognised by those who are favoured with a suitable soil and a genial climate. It is a fact, also, that certain varieties succeed better in certain localities than others—and this is one of the main points that I would impress on intending cultivators. The situation the plants occupy during the summer months also contributes in no small degree to their flowering properties during winter; and if they are, perforce, subjected to varying conditions of climate, they should on that account be generously and skilfully cultivated in summer. Now, in all cases of plant-forcing (which changes the natural season of flowering, either earlier or later) there ought to be one principle kept in view, and that is never to try to obtain by forcing what can be achieved more satisfactorily by working quietly on a system nearest to that which approaches the natural state. This is done by selecting such varieties of plants as are known to possess hardiness and constitution, and to be the earliest to flower under a natural state of

cultivation. Then again, Violets are supposed to love the shade of trees, or at least situations where they are screened from strong sun. No doubt there is an amount of truth in this, as far as it refers to particular districts; but in localities where the rainfall is heavy and the sky not over bright for any lengthened period, it would be a mistake to grow these plants much in the shade for flowering in the open borders, much more for winter flowering in pots or beds; for although they may look in excellent condition as long as mild weather continues, their leaves are not hardened, nor their crowns in that advanced condition in which it is desirable to have them; and like other immatured plants when brought under the influence of heat, they produce leaves instead of flowers. It is therefore important to remember that whilst Violets like a degree of shade, there is a line to be drawn short of either extreme, especially with regard to plants intended for winter flowering.

Violets are increased annually from cuttings, and also from seed. The old plants are lifted from the borders about the beginning of April, which is the best time for propagating, as the young cuttings or runners soon root afresh with increasing warmth in the soil, and under the growing influence of April dews and showers. The cuttings will be found numerous enough growing in the form of runners round the crowns of the old plants; these should be removed with a sharp knife, and prepared for insertion into the soil by removing one or two of the bottom leaves and making a clean cut across the joint which forms the base of the cutting. There will also be numbers of the runners found to have formed roots in the soil, and these should be set aside by themselves. When a sufficient stock is prepared, a piece of rich ground on a west border should be chosen for planting the cuttings, a line should be laid across the border, and a shallow trench about 4 inches deep made with a spade; this trench should be filled up with leaf-mould mixed with sharp sand, into which the rooted portion of the young stock should be planted, the roots being made firm in the soil with the fingers.

The lines may be about 6 inches apart, and the cuttings about 2 inches or 3 inches apart in the row. The unrooted portion of the stock will be the better of a layer of sand being laid under their base, which will hasten the rooting process and preserve the cuttings while roots are being emitted; and in the case of scarce or choice varieties, it would be still better to have the cuttings protected by a cold frame till once they have taken root—a process that will soon take place if there is a growing atmosphere kept up within the frame, and the plants are not allowed to suffer from blinks of strong sun.

That portion of the stock which is but partially rooted and unprotected will also require a supply of moisture when it is deficient in the atmosphere, and be kept well watered at the root in case of dry weather. When the plants are well rooted and fit to be handled, they

should be lifted with a five-pronged fork and arranged into three separate lots, according to size and appearance—viz., the finest and best rooted plants for pot-culture; the second best for flowering in frames; and the remainder to be planted out in a favourable site for giving a later supply of flowers in the spring.

It will be better to have all arrangements made for the reception of the plants in their respective quarters before they are disturbed from the cutting-bed, in order that the roots may receive no check through any delay. A number of 7 or 8 inch pots will be in readiness for potting—the pots having been clean washed and carefully crocked, and the soil also prepared beforehand. The soil should be a rich preparation of yellow loam, with something less than a third of well-rotted manure added; failing this, if the loam is light, a third of good honest clay which has been pulverised by exposure to the weather should be mixed with the soil: this addition will give body to a light compost, and will render it of a more enduring nature for the roots of the plants to feed on; it will also moderate the texture of the roots, and work a proportionate influence in the nature of the leaves and crowns favourable to their development for winter flowering. In potting, the soil should be made rather firm round their roots, and from one to three plants put into each pot, according to the size of the pot and other circumstances, which are more matters of personal taste than otherwise. After potting, the plants should be plunged in a cold frame and shaded from the sun for a few days, till appearances indicate that fresh root-action has commenced. Where labour is a consideration, and the work is carried on by hands occasionally employed, or as a pastime by inexperienced hands, it would perhaps be as well to grow the plants in a self-shaded spot during the hottest summer months, where they would require less attention in watering, and where there would be less to dread from the ravages of red-spider, which is a destructive enemy in hot weather. Keeping the roots cool and in a healthy condition, and supplying them with what water they require, “and no more,” and syringing them overhead occasionally, by which the leaves are kept green and fresh, is the surest way of promoting vigour and fertility in the crowns. As the plants grow and increase in size they will produce young runners, which must be kept down regularly, so as not to waste any of their strength in forming lateral growths. About the middle of August they should be more exposed gradually, and taken to a south aspect, where they should be plunged up to the rim of the pot either in coal-ashes or soil; if in the latter, they should stand on inverted pots, or on rubble of some sort, to keep a clear water-course. It will now be necessary to watch what effect the weather has on the leaves; and in case there is any appearance of suffering, some slight shade might be given during the hottest part of the day for a week or so, and syringe frequently overhead when it is safe to do so, both mornings and afternoons. The object of taking the

plants to an exposed situation is to harden and mature the crowns, and to forward them into a flowering state, with the warm, genial, autumn weather. Where such work is accomplished by professional hands, the plants, after they are potted, might be plunged in an advantageous situation at once—placing a frame temporarily over them—where they could be shaded and nursed for a time, till they have gained strength, and are hardened by degrees to stand the action of the weather. The frame might then be removed for the summer, and the details already laid down should be carried out with increased assiduity, owing to the more exposed position of the plants.

By the autumn, plants treated in this way will have formed broad prominent crowns, surrounded with sturdy foliage, which will stand our dark wintery weather vastly better than the more elongated and softer leaves formed under a system of coddling. A cold frame should be put over the plants as the days begin to grow short, and by housing time the crowns will be bristling with buds about the size of pin heads, which, if placed in a temperature of 50° to 55° , near the glass, will soon expand, and a rich return will be in store for the cultivator. The plants that are to be grown in pits or in beds will next occupy attention : a spent hotbed answers very well for this purpose by putting about 9 inches deep of rich compost over it, and planting out the plants at about a foot apart, and treating them as directed for plants in pots. These will also need protection early in autumn to bring them into an early flowering condition. We now come to those that are to be planted out in borders—and here, again, it will be unnecessary to repeat details. One thing, however, I would point out,—that if there were more exposed situations selected for planting out Violets, and if they were more generously treated at the root, and sprinkled overhead with water on the evenings and mornings of hot days, people would meet with greater success. The varieties we grow here are the Czar, and a local variety which surpasses everything else for general cultivation.

W. HINDS.



A GOSSIP OVER POTATOES.

MR GRAY has been curiously misled with regard to the Potato Redbog Early. He says, "Why named Red I am unable to say, as it is a white." Redbog is the name of the place where it appears to have originated. It is not nearly so good a Potato here as White Don, so it is not grown now. With regard to some of the other kinds noted, I was rather surprised to find Porter's Excelsior so highly spoken of; we have never had it fit to eat. Schoolmaster has turned out a great cropper; very handsome, but deficient in table qualities. My opinion of its merits to take its place as a standard sort is not high. Of the class which Blanchard represents, this past

season there were tried some six or seven sorts, all of them handsome in shape, and pretty in the markings of the several sorts, but in other respects worthless. I find no round Potatoes better in their respective seasons than are White Don, Dalmahoy, and Walker's Regent. The first-named is the finest-flavoured Potato I know. Early Market is the earliest good eating round Potato; but in this respect much depends on how the tubers are treated before planting-time. Of kidney-shaped sorts, the earliest I have grown is Early Sovereign, one of the Early Rose type: it is also the best flavoured of this class, though not a productive sort. Late Rose is the heaviest cropper; but I fancy there is an apparent tendency in this variety to revert to the type. Beauty of Hebron, the latest addition to this family, is not worth speculating in. A good selection of Myatt's is a very profitable Potato. Mona's Pride is rather earlier. Magnum Bonum I am inclined to consider as never likely to become a standard sort: it has turned out a large crop of good tubers here, but its quality is inferior. Each set was allowed a space of 5 feet by 3 feet, and the shaws produced were something enormous. Snowflake has not proved a Potato really worth growing, taking the test quality—that of eating—into consideration. It is, however, very productive, the tubers being also handsome. I had somewhere about three hundred picked tubers of this sort last season from a comparatively small space of ground. To eighteen of these was awarded a cup at a neighbouring show. At another show, held during summer, some International Kidneys which were shown were believed by many to have been rubbed over with cream or fresh butter, though merely washed in soft water and dried with a soft cloth. I have been greatly disappointed with this variety, having bought it at a high rate, not only under the impression of its being a fine sort as regarded "looks," but also an extra fine-flavoured kind. It is indeed the finest-looking kidney Potato grown, but it is not fit for table. Mr Gray mentions Bountiful. This is a kind that needs very liberal cultivation. It is possessed of a peculiar flavour, though pleasing; and when well grown, is a very good variety. It is curious that every particular variety of Potato is possessed of a flavour peculiar to itself; but, as in the case of the Pea, the number of really good-flavoured kinds is very limited. Sextus, and a sort I have been told of named Eclipse, are kinds I think highly of. Where kidney sorts are appreciated, these will be found good garden varieties. Victoria still reigns finest of late kinds. It will not be wise for any one to limit the space planted with these old approved sorts, expecting to be better with newer kinds; most of these are merely fit for pig's food.

R. P. BROTHERSTON.

THE AMATEUR'S GARDEN.

ASPARAGUS, RHUBARB, AND SEAKALE.

As my purpose is to write for owners of small gardens, who employ only a labourer, perhaps, to do the digging, &c., I will give them all the benefit I can by treating, firstly, of those subjects which amateurs least understand and have greatest difficulty in getting information about.

Asparagus.—This vegetable requires a light, deep, well-enriched soil to grow it well. In cold or northern districts—more especially if the soil be very heavy—it is apt to rot off in winter, and therefore is not adapted for growing in such situations. But most owners of gardens desire a little *Asparagus*; and for those who may be in a reasonably favourable situation for its production, I offer the following remarks:—

If the soil be heavy, some means must be taken to lighten it by mixing the staple with sandy soil, or replacing it altogether to the depth of 18 inches at the very least; and if 3 feet, so much the better. Of course the ground must be well drained. To prepare it, it must be trenched, and have a very liberal addition of manure in autumn. During dry or frosty weather, re-trench it for the purpose of thoroughly incorporating the manure. In April, mark the ground off into beds 5 feet wide, with 2-feet alleys between them. If the plants are to be raised from seed, sow it thinly in rows 18 inches apart; when the plants come up, thin them the first season to 3 inches apart, taking out every second plant the following year. Between these rows Spinach, Turnip, Onion, Lettuce, and other dwarf crops may be grown the first two years, as the *Asparagus* will not, until then, occupy the ground fully, and crops such as these will do no harm. If preferred, the seed may be sown on a small bed, and afterwards transplanted on permanent beds prepared as has been described. Unless very well grown they may stand in the seed-bed for two years, as *Asparagus* is about four years, under ordinary cultivation, in coming to perfection; and two-year-old plants are generally good for planting. If sown where they are to remain, they will not receive the check which transplanting gives; but many prefer growing them in seed-beds at about 5 inches square until they are ready to transplant, and then they have the beds freshly prepared when they are planted. When the grass dies down at the approach of winter, cut it carefully over, and cover the beds with 2 or 3 inches of rotten dung. But amateurs may purchase their plants and transplant them in beds as described, and thus save the weariness of waiting for returns. The best time to plant is in April, in cold, late districts; and in March, in dry, warm ones, and just as they are beginning to move. If home raised, lift the plants with a fork very carefully, a few at a time, and plant them before they are much exposed to the air; if bought, leave them as little exposed to the weather as possible. The best way of planting is to stretch the line where the rows are to be, and beat the ground on both sides (as is done when Box edgings are laid), and then cut a trench 6 inches deep along one side of it, and put the plants in with their fibres spread out, and covered with well pulverised soil, keeping the crowns 2 inches or so below the surface. When finished, give a good watering if the weather be dry, and mulch slightly with rotten dung. If the garden be exposed, it may be necessary to put in stakes, at distances of 4 feet, along each row, and stretch on them three rows of string, to which each stalk should be secured, as the wind may twist them over by the neck, and so destroy the plants. Mulch in winter as before directed.

Do not cut until the stem be coming up as thick as one's little finger; if they never grow that size they are a comparative failure. When they are that size, as they should be in two or three seasons at most, be careful to cut above the crown, and not destroy the rising buds. If not very strong, do not cut later than the end of May, otherwise they will be so much weakened as to prevent them fully recovering lost ground during the summer. If very strong, the cutting may go on until the 1st of June—not later. Afterwards encourage all possible growth so as to lay up a store for another year. In very suitable soils beds last many years when properly treated; in unfavourable soils they soon wear out, and must be renewed accordingly.

Forcing Asparagus.—It is not likely that many villa-gardeners will practise this. The best method in small gardens is by means of a hot-bed; in large well-appointed ones, pits heated by hot-water are used. The best hot-bed for the purpose is one composed of half stable-yard manure and half leaves gathered off the lawns, &c., and kept dry for the purpose. These should be thrown together—well shaken out—and get a little sprinkling of water if too dry, and turned twice, at intervals of a week, or when it has fairly heated each time. It is then built up perfectly square a foot wider than the frame which is to be put on it, and firmly beaten down with the fork as the building proceeds. While building, keep it all equally level, and do not build one side before the other. When 3 feet high, put on your frame, and build your hot-bed material up to the top of the woodwork all round, then put on your light or lights, and wait for a day or two until the heat rises. If too dry, or if there be too great a proportion of fresh stable-yard manure, it will heat too violently. But if the leaves were a little decayed, and the stable-yard manure not too fresh with the preparation described, it ought to rise gradually to 80° or 90° in the middle of the bed; and if there be no signs of it going higher, then get in the Asparagus roots with all possible speed. They can be bought, or you can rear them, but they will require to be four years old from the seed and fairly well grown before they are ready to force. They should be protected in their beds from frost, so that they can be lifted easily at any time. Lift carefully with a fork, and after putting 3 inches of friable soil on the bed, begin by putting the plants upright and quite close together; and when a sufficient quantity is in, fill in between the plants with fine dryish soil up to the crowns, and give a watering of tepid water to wash all interstices full, and over all put 2 inches of the same description of soil.

If succession crops be wanted from the same frame, divide the frame into the necessary divisions with boards, and fill each division at intervals of a week; and if necessary a second frame can be prepared in the same way. I have been thus particular because such a bed as I have described forms the very best appliance whereby to force Seakale and Rhubarb during winter, and is just the thing for Cucumber and Melon in summer, so I will not require to give directions for forming beds when treating of those subjects. There is this difference between Seakale and Rhubarb and Asparagus: the first two require to be kept in total darkness to secure the best results, but Asparagus is decidedly inferior when thus forced. To have it in full perfection both light and air are needful, so a glass frame is necessary; whereas any kind of frame, even hoops and mats, will do for Seakale and Rhubarb. The temperature for each and all of these requires to be between 50° and 60°, above that, they will be drawn and flavourless; and should the temperature go below that by reason of severe weather or a declining heat in the bed, mats or straw will be necessary to protect both frame and bed: and

linings ought to be applied. By linings I mean that a foot of material all round the frame should be removed, and *two* feet of hot manure put in its place. A cold frame put over a bed will forward it in the open ground a week or two.


Rhubarb.—A deep, rich, cool soil grows Rhubarb best; but it can be grown well in any garden soil if dug deeply, and well enriched with cow and horse manure. The best time to plant it is just when the leaves have newly dropped, although any time during winter or spring, before the buds have pushed much, will do very well. Divide the old plants into single eyes, securing as much root to each eye as possible, and plant in rows not less than $3\frac{1}{2}$ feet each way. Just cover the lower half of the buds in planting, and when finished give a good top-dressing of rotten dung, which will keep out frost in winter and drought in summer, and will afford nourishment to the plants besides, more especially in thin soils, as the roots will be encouraged to extend up to the top-dressing instead of down to the poor but perhaps moister subsoil. The leaves will very soon hide the dressing completely. After the first year liberal drenchings of cow-house drainage, or failing that, house sewage, will do much to give a rapid, rank growth, which is the way to produce the best Rhubarb. No stalks should be pulled the first year unless it does extremely well, when one or two may be taken from each bud about midsummer, but by no means later or it will start very weakly the following spring. And ever afterwards this rule should be strictly followed. The return of crop from the Rhubarb plot of most villa-gardens is not worth the rent of the ground, and simply because it does not get a chance to grow. If there be any troublesome weed in the garden, the best way to weaken and eventually kill it is to treat it as many persons, who do not understand the functions of leaves, treat their Rhubarb—and that is, to pull off every leaf as fast as it makes its appearance. But if it be allowed to grow strongly and only judiciously thinned, taking care to leave two or three leaves to each bud, and not to pull wherever a suitable stalk is found, it is wonderful what an amount of Rhubarb can be taken from a very small space.

Forcing Rhubarb.—Although I could scarcely recommend the forcing of Asparagus to every amateur, I decidedly advise them to force Rhubarb, as it is so easily prepared. A good way is to put up a bed as recommended for Asparagus; and the best way to prepare plants for forcing is to make a plantation yearly on good ground, giving one season's growth without gathering from it. Grown this way, the plants are of a fine handy size, and have a great amount of matter stored up which will yield well when forced. Of course old plants will do, but the results will scarcely be so good, and old plants are difficult to handle without injury. These young plants can also be forced in the greenhouse, vinery, &c., under stages, where nothing else will grow, or even in a cellar or any place affording a temperature of 50° and upwards. The way this is generally done is to put the roots, as many as possible, into good sized pots with fine soil kept moist, but not wet, and another pot placed over it with the joint and holes made air-tight, to secure its being properly blanched. But the commonest way is to put square boxes, with no bottoms and movable lids, or seakale covers, or large pots, over the plants as they grow in the ground, and then cover these with stable litter and leaves to the depth of 2 feet, and the same round the sides. The boxes will require to be about 20 inches square and deep for large old plants; for small plants smaller boxes will do. It can be had in this way from Christmas onwards if desired, or indeed earlier, but not many owners will care about having it earlier. In severe weather a cover-

ing of straw or mats over the prepared manure will be beneficial, indeed necessary to enable the dung to retain its heat.

In putting up secondary beds, part of the old manure can be used with the fresh; and indeed, by the end of February, a fourth part of fresh material used with the old will be enough, as little excitement will cause it to grow late in the season, and less fermenting matter will keep up the temperature. The mere pots or boxes in March will forward it considerably.

Seakale.—This is about the most generally appreciated winter vegetable we possess, and forcing improves its quality. The plant thrives well on many parts of our sea-shores in pure sand, and this indicates that a light soil near the sea is the best. And certainly it is the best, although it can be grown on any good garden-ground, deeply dug and well manured. As in the case of many other sea-shore plants—the Asparagus, for instance—a slight top-dressing of salt occasionally in inland situations where the rains are free from salt, does a great deal of good. Many apply salt to such crops, and finding no benefit to accrue therefrom, come to the conclusion that the use of salt is unwarranted. But in the case of really sea-shore plants, or plants furnishing an appreciable quantity of chlorine and soda or other ash, salt *does* do good in *inland* situations; and if care be taken, it will be found that, where no benefit accrues from its use, an appreciable quantity is found in the rains, which come from seaward.

Seakale is raised from seed and from cuttings of the thick fleshy roots of old plants. Having practised both methods, I prefer the first, but shall describe both. Seed can either be sown where the plants are to remain, in the case of permanent plantations, or in beds, as recommended for Asparagus, and afterwards transplanted. I prefer sowing where they are to remain, as a means of saving time. Sow in rows 3 feet apart, and 3 feet between the plants, placing the seeds in this manner ; and when they are up, leave one plant as represented by the dots; and between the rows I take a crop of small growing Cabbages, Turnips, Lettuce, &c., the first season. A winter's mulching of manure, forked in March, prepares them for another year's growth, when they get all the ground to themselves, and, if it be in good condition, they make fine patches for forcing where they stand by means of boxes and manure, as advised for Rhubarb. When the plants have produced their crop, and the boxes are removed to another lot, the stools are protected with a little litter, and allowed to grow on in summer, to prepare for another year's forcing in the same way, and so on until the plants get unprofitable, when another bed coming on can take their place. The very last batches can be blanched by merely turning pots or boxes, with all air-holes stopped up, over the stools. Leaves alone, if put thick enough, and firmly beat together, will do very well as a heating material; but care should be taken not to run up the heat too high, or the produce will be drawn and watery—50° to 60° is quite high enough. Forcing commences in ordinary gardens in November, although in some cases Seakale is cut by November. If the material be right, it will be fit to gather in five or six weeks from the time of covering up; but if it takes eight weeks, no matter. But when time and labour can be spared to make new plantations, the following is a very good way to produce this vegetable during the colder months of the winter: Sow the seed in drills 2 feet apart, on deep, light, well-enriched soil, about the beginning of April. When the seeds are up, thin to 18 inches apart; and if liberally watered with liquid-manure, they will grow very strong, and be ready to force the first year: but as skill, good soil, good climate, and plenty of manure are necessary for this, perhaps it may be considered rather smart work for an amateur. So, if the soil and climate and

skill be only mediocre, then sow in drills 1 foot apart, thinning to 6 inches in the row, and transplant to the distances above mentioned the following spring, and fine roots for forcing will likely be the result. The forcing in this case is just exactly the same as recommended for Asparagus, by means of a hotbed and frame—only keep perfectly dark; and if the roots be strong, fine Kale will result. In all cases of cutting, cut a thin section of the old crown, for the purpose of keeping the “head” together. It is also forced along with Rhubarb in Mushroom-houses, or as recommended for Rhubarb, in warm cellars, in pots.

In propagating from roots, cut the fleshy roots into 10-inch lengths, and transplant them with a dibble, keeping the right end up, and 1 inch below the surface; and if more growths than one result, remove them, leaving the strongest. On thin, poor soils, a slight mulching of rotten manure and occasional soakings of liquid-manure during summer—such as sewage, or farm-yard drainings—will prove of the very greatest service in promoting a strong vigorous growth, which is what should be aimed at if a fine succulent vegetable be wanted. At a recent meeting of the “Scottish Horticultural Association,” Mr L. Dow recommended forcing the Swedish Turnips for a substitute; and having done so for some years, I can also recommend this. Indeed our main supply is got by turning a part of the store (put up in pits for the supply of the cows in spring) from February onward, when the sprouts are to be had in fine condition; and although similar to Seakale, they are prized as a *variety* of vegetable when others are scarce, and a lesser quantity of Seakale serves. As Mr Dow says, it is certainly economical, for Turnips are easily grown, and, except the shoots forced out, they are not otherwise deteriorated, and remain good cattle-food after being forced.

A GARDENER.



TRANSPLANTING AND POTTING CAMELLIAS.

THIS appears to be a task of difficulty to many, considered a hazardous undertaking, and in numerous cases as certain death to the plants. I have heard it remarked times almost without number, that the lifting of a large plant or plants would place their life in jeopardy; therefore the Camellia is looked upon as a plant not to be touched in the way of lifting, after having been planted out. I can point to cases where death has been the result of lifting, and the notion has afterwards been entertained that the plants might as well die for the want of lifting as be killed by removal. It should be considered, however, whether this work was performed at the proper time, or was intrusted to competent hands. Plants lift better out of some borders than others. If the soil be light, the roots soon wander away, and cannot be lifted with good balls; but if the soil be of a heavier nature, and made firm round the plants, the roots are nearer home and lift well.

I know of large plants which have been almost periodically lifted for a long time, and in every case with good results—never losing a crop of flowers. In some cases the plants were lifted because they grew too luxuriantly in their new border, after being confined to pots

and tubs ; in other cases, to give room to Palms, Tree-Ferns, Dracænas, Yuccas, &c. I have been engaged in lifting large plants of *Cibotium princeps*, with a spread of fronds of nearly twenty feet ; *Dicksonia antarctica* and *D. squamosa*, ten feet over, which are now nearly twenty feet ; as well as Palms, Dracænas of the *Veitchii* type, and others,—and in every case with satisfactory results. Camellias can be lifted as safely and satisfactorily as a *Cupressus* or a Portugal Laurel, provided the work is executed carefully by persons competent to do it, and at the proper season. In such cases, I would recommend the chief to be there to see that such work is properly carried out, and not left to those who care but little if the plant lives or dies, and who are ignorant of its requirements.

The proper time for carrying out such operations has been referred to. Some cultivators repot all their plants in the spring, and say, because growth is well commenced and the roots are active, this is the proper season. I prefer the autumn, after growth is completed and the flower-buds beginning to swell. Their roots are then active, and the plants are less liable to be damaged than when they are growing in the spring. To lift them when the growth is advancing apace checks them more or less, and consequently impedes the rapid progress of the young shoots. If lifted in the autumn, while the roots are active, they soon take to the new soil, and are ready for a good start in the spring. In some cases, I have seen the following season's growths vigorous and fine, and no one would know that they had been removed, and scarcely a flower-bud fell.

A number of Camellias in pots came under my notice some seasons ago. They were in a very unsatisfactory state, the soil being sour, and some of the plants nearly washed out of their pots with water. They had usually thrown off the greater number of their flower-buds. The growth of the plants in question was completed in August, and the buds began to form. They were then turned out of their pots, the sour soil carefully taken from the few roots they had, and were again repotted in smaller pots, using plenty of sand amongst the compost, with the idea of getting some fresh roots and giving them a liberal shift the following season. After being potted, they were plunged in a slight bottom-heat, in a north aspect, keeping the tops cool. By the time the flowers expanded, the plants had made a good quantity of fine healthy roots, lost only a very small percentage of their bloom, and did all that could be desired the following season.

WM. BARDNEY.

NORRIS GREEN, WEST DERBY.

NOTES ON DECORATIVE GREENHOUSE PLANTS.

THE CAMELLIA.

FROM the fact of its flowering at the time when flowers are generally scarcest, and the demand for them greatest, the Camellia, both for cut flowers and house decoration, fills a gap in a way that few other plants can do; the flowers are always desirable, and always valuable, so that it must be considered one of the most indispensable of our decorative greenhouse plants. Its natural season of blooming is from December onwards till April, and though with proper treatment it is quite possible to have them in flower as early as August, still the flowers are never so good, and certainly they are never so much valued at this season as when they flower in the dull winter and spring months. Where they are wanted to flower early, they should be kept in heat while they are making their growth, and until the buds are well set, after which fire-heat should be discontinued. While making their growth they should get a dewing with tepid water occasionally, through a syringe, in order to keep the foliage clean and healthy. By starting them a little earlier each succeeding year, they will in a few seasons be induced to start away early of their own accord, or at least with very little assistance. Like Azaleas, the Camellia is imported in large quantities every year from the Continent, and at a very reasonable price: so that unless one really wants to propagate one's own plants, by way of practice, it is hardly worth the trouble of doing so; still sometimes one likes to try their hand at such things.

Cuttings of some of the strong-growing single varieties, such as Tricolor, may be put in to root in order to make stocks for grafting upon. They should be put in singly, in small thumb-pots, and plunged in the propagating-frame, in a bottom-heat of about 80°, and in a mixture of peat, rubbed through a fine sieve, leaf-mould, and sharp sand. Cocoa-nut fibre is a good plunging material, or sawdust will do very well. They should be dewed slightly through a syringe on the evenings of hot days, and kept pretty close until rooted, after which gradually inure them to air and exposure, and encourage to make good strong growths, gradually increasing the quantity of air, so as to get the wood well ripened and ready for grafting the following season.

This operation should be performed in the spring of the year, when the sap is in active circulation, though some prefer to do it in the autumn, when the growth is more matured. The stocks should be first plunged in the propagating-box for a short time before operating upon them, so as to have them in active growth: side-grafting is the method usually employed. The scion should be securely tied with matting, and then covered over carefully with grafting wax, and each plant labelled and returned to the frame as it is finished, and kept close until the union is completed. There should be a brisk bottom-

heat, and an atmospheric temperature of about 65° should be maintained. After the grafts have taken, gradually inure them to air and light; and the stock may be cut away above the junction after they have made a few inches of growth; pinch out the points, so as to induce a bushy habit. They may be shifted into larger pots as they require it, using peat, leaf-mould, and sand, only a little rougher than at first, until they are into 6-inch pots. In all sizes above this, they should have a considerable proportion of good turfy loam incorporated with the compost, as also a few pieces of charcoal. Indeed, if the loam is good, they will be better grown entirely in it, with a sixth part of sharp sand and a handful of ground bones.

Larger plants will be much benefited by an occasional watering of liquid manure when they are making their growth, and again when the flowers are beginning to expand. There is nothing better for this than pure guano or soot-water, allowing either of them to lie in steep for a night before using, and then keeping back the sediment; this does not choke up the pores of the soil like manure-water made from sheep or deer droppings. The *Camellia* is not susceptible to the attacks of insects, unless, sometimes, brown scale, when the usual remedies must be applied. This will be found in most of the insecticides sold by nurserymen, directions for use being always given along with them. Appended is a list of good varieties—viz. : *Alba plena*, *Archduchess Marie*, *Augustina superba*, *Bealii*, *Bianca Gualdini*, *Cardinal Antonelli*, *Duchesse de Berri*, *Duke of Lancaster*, *Eximea*, *Fimbriata*, *Marchioness of Exeter*, *Pearl*, *Reine des Beautés*, *Storyii*, *Thomas Moore*, *Valtevardda*, *Vicomte de Nieuport*, *Imbricata*, *Jubilee*.

J. G. W.



EUPATORIUM ODORATUM.

ONE of the most useful winter and spring flowering plants is the above. Coming in as it does when flowers, and especially white flowers, are getting scarce, it is the more useful, and is not cultivated nearly so much as its merits deserve. Not its least recommendation is the small amount of care required in its culture. After the plants have done flowering they should be cut back, and put into a vinery at work to break again into growth, in order to get cuttings. These should be taken off exactly as we do *Fuchsias*; and, in fact, the same treatment that we give to *Fuchsias* suits them exactly in the earlier stages of their culture. When rooted, pot them off singly into 3-inch pots; they are not particular as regards soil, the same used for *Fuchsias* and *Geraniums* will suit them nicely; keep them well pinched while they are young, as they are apt to get leggy. The next shift may be into 6-inch pots, which will be large enough to bloom them in the first year. They should be grown in a temperature of about 55° till the middle

of May, when they may be gradually hardened off: and when danger from frost is past, they may be plunged out-of-doors, in a sheltered place, but fully exposed to the sun. They must be duly attended to with water, and occasionally pinched. They may be brought under cover about the beginning of October, and the first batch will come into flower about the end of November. The old plants will bloom a month earlier, and by having successional batches of cuttings, they may be had in bloom up to April or May. It is a most useful plant for cutting from, and its beautiful dark green foliage lends additional charm to it. It has also a very sweet perfume, somewhat resembling the smell of honey; and, by the way, the bees are very fond of it. The flowers stand well when cut; and the plants stand rooms well. There is another variety—viz., *E. riparium*; it is not so good nor so free-flowering, however, as the variety above-mentioned.

J. G., W.



THE GARDENER'S PRIMER.

THE object of the following remarks is to endeavour to give to the young gardener some insight into the nature of the subject in pursuit of which he has cast his lot, and is not intended in any way to supersede the necessity for his learning the art of horticulture from those who are capable and willing to take the trouble of teaching him, nor to lead him to neglect the study of Botany in all its branches in any of the advanced text-books on that science.

A practical acquaintance with some of the elements entering into the composition of plants—some knowledge of the climate, soil, and situation of the countries in which they grow, and of the diseases to which they are liable, or predisposed, and the causes thereof, and the remedies to be made use of, and of the hosts of destructive insects which feed on them, and of the methods for removing them, and of some of the elementary Laws of Physics—will materially assist the gardener in acquiring a sound knowledge of the practice of horticulture.

Some of the elements which are known to enter into and form part of the structure of plants are carbon, hydrogen, oxygen and nitrogen, sulphur, phosphorus, and chlorine, which, in combination with sodium, forms chloride of sodium (sea salt); and in some form or other plants derive nutriment from chlorine, iodine, bromine, and silicon, which, in the form of flint or silex, enters largely into plant structure, although more so in some plants than in others, and in combination with oxygen and metals it forms a class of minerals called Silicates.

Other of the elements are of the metallic class, such as calcium, in its carbonate state as limestone constituting vast mountains, and as chalk, enormous beds, which are decomposed by the action of the atmosphere and by rain-water, which, by-the-by, contains carbon dioxide (carbonic acid) : this limestone or chalk when burnt in a kiln becomes calcium monoxide or quick lime. Aluminium in the state of an oxide of aluminium is clay, which is felspar weathered or exposed to the action of the atmosphere until disintegrated, and felspar is a double silicate of aluminium and potassium. Other of the elements are magnesium, potassium, and sodium, the two latter not identical in their operation, the one not supplying the place of the other in plant structure ; and in combination with oxygen are the alkalis potassa and soda. The former (potassium) enters largely into the composition of land plants as a chloride, and is obtained by them from soils produced by disintegration of granite rocks. The presence of potassium in plants is easily proved by burning them, but the ashes, popularly called Potashes, will not contain the element in the state in which it was in the plant during its life, but in the state of a carbonate ; it is said to enable the plant to prepare and form starch. The latter (sodium) enters largely into the composition of marine plants.

Other elements in the composition of plants are iron, supposed to be necessary to the formation of chlorophyll, copper, manganese, and lithium, which last occurs in the ashes of the Grape Vine, Tea, Coffee, and Tobacco plants, in the milk of cows which have fed on plants growing in soils containing lithium, and in moor water, and is one of the most widely distributed elements.

Carbon, hydrogen, oxygen, and nitrogen have been called the organic elements or organogens ; sulphur and phosphorus have been called pseudo-organic elements ; and calcium, aluminium, magnesium, potassium, sodium, iodine, bromine, silicon, iron, copper, manganese, and lithium, have been called the inorganic elements. The distinction is not a desirable one, to say the least, since, whether any of them are essential to plant life, and others only partially and not universally present in plant structure, it seems apparent that, as soon as any plant has utilised any one of the so-called inorganic elements, it has then formed as much a part of the organic structure of the plant as carbon, hydrogen, &c. The only way out of the difficulty is to avoid the use of the words organic and pseudo-organic as inapplicable to the above elements in reference to plant life.

Some knowledge of the atmosphere by which our world is surrounded will soon be found necessary. The atmosphere or air is composed of the gases nitrogen, oxygen, aqueous vapour or vapour of

water (produced by evaporation from water in some of its many forms, and its amount therefore varying with the temperature), and carbon dioxide (carbonic acid) and ammonia, which is composed of nitrogen and hydrogen. The vapour of water is the lightest of all gases, except hydrogen and ammonia, is invisible, is largely absorbed by plants, but on its condensation by cooling is visible as a cloud, mist, dew, rain, snow, or water, and to the latter forms of it we are indebted for the supply of water to our springs and rivers. It is to the vapour of water that we are indebted for the beautiful appearance of the atmosphere, which by preventing the too rapid radiation of heat from the earth, affords as it were clothing and protection to vegetable life.

A knowledge of the attributes of vapour of water or aqueous vapour will enable the gardener to understand and overcome many difficulties when he works in the plant houses, where he will soon see the effects of aqueous vapour evaporating from the open water tank, or from pools of water purposely thrown down, in its condensation on the cool glass, dripping down, and often spoiling the foliage of plants, especially of orchids; or in a vinery filled with late Grapes, if the lights are left open in dull moist weather, the aqueous vapour of the atmosphere will enter and condense on the cold berries of the Grapes and lay the foundation for many a rotten berry.

A knowledge of some of the laws of heat will be very serviceable; without heat the sap cannot rise in the plant cells, nor the seed germinate. To the expansion by heat of all bodies (whether solid, liquid, or gaseous) the gardener is indebted for the thermometer, which, by the rising or expansion of the mercury in the tube, shows on the face of it the degree of heat, whether in the open air, on the surface of the earth, or in the plant house, or even in the hot bed formed of stable-manure (if a thermometer specially constructed for that purpose is plunged into it), a great advantage by-the-by over the old fashioned way of leaving a stick plunged in the hot bed and pulling it out occasionally, and by the personal contact with the hand guessing whether the heat called bottom-heat in the hot bed was sufficient. Again, to the laws of the expansion by heat as applied to fluids, the gardener is indebted for the power of heating with the hot-water apparatus, as it is often called, the houses placed under his care; and to the pressure of the weight of the atmosphere the gardener is indebted for the barometer and the common pump.

To return to that part of our remarks in which carbon dioxide (carbonic acid) was mentioned as a constituent of our atmosphere. It is the great material with which the plant builds itself; most of the carbon in the plant is formed from carbon dioxide. It forms only a

small portion of the lower part of our atmosphere ; but owing to the law of diffusion of gases and other causes the quantity is never lessened, notwithstanding the continual abstraction of it by millions of hungry leaves. It is itself supplied to the atmosphere from active volcanoes, in large quantities, from fissures or cracks in the earth, from the breath and exhalations of animals and fishes, from burning substances containing carbon, from the decomposition of substances containing carbon dioxide, such as chalk or limestone (both of which are animal formations), and from rain and sea-water.



POINSETTIA PULCHERRIMA.

WE have many varied and rich floral colours of singular beauty and attraction to please the eye, elevate the taste, and otherwise charm the fast-declining days of the year—the cultivator having by previous forethought and care produced many subjects wherewith to brighten its retiring hours. Amongst the numerous species of plants suitable for such a purpose, I think the Poinsettia occupies no unimportant position.

Although now very generally grown and utilised for winter decoration, I would endeavour, by giving a few cultural remarks, to establish it in the position which its merits justly claim. Its worth and beauty call for greater attention than has been hitherto accorded it.

The easiest mode of propagation is to take well-ripened shoots of the previous year's growth, with good buds on them, and with a sharp knife form them into "eyes," in a manner similar to that adopted for Vine eyes. Where a large stock is required, wide pots, or, better still, ordinary-sized seed or cutting pans, will be found most suitable : these should be thoroughly well drained, nothing being more essential to healthy vitality than a compost perfectly free from sourness. With good drainage, a compost of fibry loam, leaf-mould, charcoal, and a liberal addition of sharp sand, may be used. Fill the pans to within an inch or so of the top ; sprinkle a layer of sand over all. Insert the eyes, leaving their upper extremity merely visible, at a distance sufficient to clear the eyes and admit of easy extraction of the most advanced when potting time arrives. Plunge in a bottom-heat of 80° to 85°, having a surface-heat of 70° to 75°. No water should be given for several days, until the pores are closed, or they will discharge a considerable amount of white acrid matter peculiar to the genus.

The compost not being over-dry, very little more water will be required than an occasional moistening to prevent the sand getting powdery until growth has taken place. Water should be given very carefully, as the eyes suffer in a marked degree from over-dampness.

Eyes put in during March will be fit for potting into small pots in the early part of May, in a compost of loam, leaf-mould, and sand.

In removing the young plants which have pushed before the others, care should be taken to prevent their roots getting broken, they being of a very succulent nature. They should be well shaded from sunshine until established, or drooping heads will be the consequence. With a surface-heat similar to that in which they were rooted, they will speedily fill their small pots, and should be grown on without a check by shifting into 3 and 4 inch pots; and as they root, they may be gradually inured to cooler quarters. Those in the smaller size can be potted into their final 5 or 6 inch pots, using compost of loam, charcoal, and well-decayed cow-manure.

By the beginning of June they will be sufficiently hardened to admit of being grown in an unheated structure. We succeeded admirably, even in Cumberland climate last year, in growing a very large quantity in cold pits, slightly shaded from direct sunshine, and were rewarded with plants clothed to the base with rich dark-green foliage, which the cooler treatment tends to produce, as well as at the same time materially to assist in providing stamina for floral development. They were removed by the middle of September into a gentle heat, pushed gradually on for two months in a minimum temperature of 60°, and were in flower by the beginning of December.

Well-rooted plants introduced to heat will stand copious manure waterings. The quantity should be decreased, and finally withdrawn, ere the scarlet bracts attain full development.

Poinsettias, if grown by themselves, are not much subject to insects, thrips being their chief enemy, which may be got rid of by smoking. They require no syringing overhead—an occasional moistening of the structure being sufficient. When the bracts have been cut, water should still be given—not discontinued, as some do—until the foliage and stems have been properly matured and fitted for a good start next season. In the case of plants intended to be grown in the second year, their shoots may be cut down to within an eye or two of the base, and be kept partially dry until they heal their wounds; but the roots should not suffer for want of an occasional watering, which may be given more freely as the eyes push forth into growth. When they have made a slight start, shake them carefully out of the old soil, and pot them into a smaller size, in a compost of one part loam and one part leaf-mould and sand, using for next and final shift an addition of decayed cow-manure, and treated in all respects as those raised from eyes. For decorative purposes in rooms and halls they are objects of great attraction; as also for vases or table decoration, and for making gay stoves in which foliage-plants predominate. There are two varieties cultivated in this country—*P. pulcherrima* and *P. p. plenissima*, the latter succeeding the former, and keeping up a long succession of flowers. The latter variety has been highly spoken of in influential quarters, but I confess to having neither seen nor as yet grown such splendid examples as certain writers have stated it to be capable of. I do not

wish, however, to detract from its reputation, as probably it may not have had exactly the treatment it requires; but grown under the same conditions as *P. pulcherrima*, I do not consider it so useful as the latter and older variety.

R. B.

BRAYTON.



SPORTS AND SPORTING.

I AM going to write a few words (as few as possible) on a subject on which I am, in common with every one else, very ignorant, and that is on "sports." Sports do occur, although at extremely rare intervals, considering the millions of plants which do not sport to the one which does. That much is certain and unquestioned. But whether this occurs in accordance with some ruling law in vegetable physiology, no one, so far as the writer is aware, has ever made clear, or even stated a plausible theory concerning it to account for the fact. There is another thing in vegetable physiology similar in some respects, but greatly different in others, which is also unexplained, but, unlike the "sports" proper, has been much theorised on without making us much the wiser—I refer to the influence of scions on stocks. In a great majority of cases a stock retains its original nature, no matter how great may be the difference between it and the scion. I say in a majority of instances, although a good many examples of the opposite have occurred, showing that occasionally the stock does partake of the scion's nature—nay, properly authenticated instances have occurred when the stock was wellnigh transformed into the living image of its scion. To be sure, not many, if any, experiments have been carried on to test the influence of the scion on the stock, else, doubtless, a great many more instances might have been chronicled,—perhaps as many as on the reverse side of the question—the influence of the stock over the scion. When the latter occurs it is at once seen, if at all marked in its features; while what influence the scion may have exercised on the stock is hid, buried, and the growth which might show the influence is carefully repressed, and when the head dies the stock is grubbed out. Still, we have enough instances to show that generally the scion does *not* alter the character of the stock. No matter how long may be the life of a hybrid perpetual Rose, if budded on the Manetti, when the Rose dies up comes the Manetti briar as pure in blood as its parent was when taken from its sunny home; and in no case that I have seen, or remember reading of, has the influence been noticeable. And yet we have enough of instances to show that, no matter how inexplicable it may be, the

stock is altered *occasionally* by the scion, but perhaps not once out of a million, perhaps ten million, times.

I remember reading of a Jasmine—a common green variety—on one of the branches of which was budded a variegated one. The first year it made a growth true to the variety from which the bud was taken. The year following a shoot similar in every respect to the inserted variety appeared on the stock, nearer the ground than the inserted bud. When this was noticed the “foreigner” was cut out entirely, so that the stock only was left ; but still the variegation continued to spread until the whole plant, to the ground-line, became variegated. And how ? That is just what I want to know, and that is what has never been explained, and it seems doubtful if it ever will ; for if such a thing really did occur, according to any discoverable physiological *law*, how comes it that such cases are so few and far between, and the exception rather than the rule ? Bud a million Jasmines with a variegated bud, and the likelihood is, not one will behave as I have described. There is much in vegetable physiology that is inexplicable, but not one point more so than the question before us. What circumstances can we provide to any class of plants in order to cause them to sport ? Certain fugitive plants—*Stella Geranium* for one—will sport into a variegated form occasionally, if starved in dry, poor, sandy soil, and the opposite treatment will cause it to revert to its normal form. The same is true of *Cyperus alternifolius*, and of that most beautiful *Coleus Duchess of Edinburgh*, and a host of other subjects. Sports, then, do occur, and again revert to their normal form. But can a stock which reproduces a certain form, which may have been grafted on a portion of its stem and then wholly removed, be called sporting ? This is a question which will require to be better understood before being answered either affirmatively or negatively with any degree of confidence ; and while no explanation is forthcoming, the only sensible course to pursue is to reserve our judgment while evidence is being collected.

As may be guessed, the above has been suggested by the discussion on the Culford Vine sport, so called—rightly or wrongly, I do not pretend to say. But as the particulars of that case were stated in good faith by men respected for their intelligence and professional attainments, sneers and clumsy jokes are not likely to have much influence among those who have given some little attention to such matters. The case is exactly similar to the Jasmine ; and if the thing is credible in the one case, it is equally credible in the other. It certainly is an extremely unlikely thing to happen ; but until we have more instances, we ought simply to reserve our judgment, as we have said before, and especially when we remember that such things are

really not quite unknown. Were the thing actually deserving attention, I might point out that some of the matter written against the very idea of its being at all to be believed is really not criticism. Personally, I am quite unknown to any of those whose names have been mixed up with the matter, and have no interest in defending either one side or the other.

A. HONEYMAN.

HOPE PARK.

[We scarcely think the case of the Jasmine, referred to by our correspondent, can be considered a parallel case to the Culford Vine sport. Such sporting as that of a variegated branch appearing on green plants is common enough, and in some cases the insertion of a variegated scion ultimately leads to the stock producing similar variegation, but always the same flower and fruit as the normal green plant. These productions can be perpetuated indefinitely by the ordinary methods of propagation. The Culford sport was said to be a bunch of Golden Champion, produced from the wood and foliage of Trebbiano, which is a very different phenomenon; and its correctness is doubted, because no parallel case to it is to be found on record, and because the wood and foliage that were supposed to have produced the said bunch failed to do so again. We not long ago saw a bunch of Trebbiano with such abnormally large berries that it might easily be mistaken for Golden Champion. And we have been eye and ear witness to the very best of judges mistaking Buckland's Sweetwater for Duke of Buccleuch first, and when the judge was contradicted, he said, "Then it is Golden Champion." We have plenty instances of the best of judges making such blunders, but no instance of the fruit of one Vine supposed to be found on the wood and foliage of another, except in the case of the sport in question.—Ed.]



CULTURE OF HOYA BELLA.

THIS beautiful species is popularly known as the honey-plant or wax-flower, and well deserves a place in every collection of stove-plants, however small. Its waxy white flowers, with beautiful rose-coloured centre, are produced very freely from midsummer to far on in the autumn months, and are especially adapted for bouquets, &c., although some object to them for that purpose, owing to the umbels being so stiff-looking; but that defect can be somewhat remedied by "wiring" the individual flowers—or even two or three can be put together and used towards the centre of the bouquet, where light colours are indispensable, using larger and more dark-coloured flowers toward the extremities. The plant is of a semi-scandent, compact, free-flowering habit, and is very suitable for growing in baskets suspended from the roof of the stove just above or near the passages, where the delicate flowers can be easily seen by those walking round the house. The baskets generally used for this purpose are made of stout wire, and are very ornamental. They should be well lined with fresh Sphagnum moss before the soil and plants are put into them; and

they must not on any occasion be allowed to suffer for want of water at the root, for in such a position they are apt to be neglected.

It also makes a beautiful exhibition-plant when grown to a large size, and tied out to very neat, small stakes, something in the same way that we would recommend for double Petunias. Cuttings of the half-ripened wood will strike very freely in a gentle bottom-heat, with plenty of moisture; and after they are well rooted, they should be potted off singly into $2\frac{1}{2}$ or 3 inch pots, and kept close and shaded for a few days from bright sun, after which gradually inure them to a light and airy position near the glass.

The soil best adapted for them is equal parts of turfy peat and loam, a little sharp sand, and plenty of broken pieces of charcoal to keep the soil open.

In potting, be careful to drain the pots well, and use the soil a little finer for young stuff than for larger plants; and as soon as the cutting-pots are full of roots, shift on into such larger-sized ones as may be deemed necessary, and stake and tie the plants into proper shape.

When making their growth, they should be freely watered at the roots and syringed overhead on fine afternoons, keeping up that degree of humidity which is so essential in the cultivation of stove-plants in general. This, however, must be varied according to the existing state of the weather, as a degree of humidity may be indulged in on fine sunny days which might prove dangerous in dull rainy weather.

The plants should also be fully exposed to the sun at all times; and as very fine large specimens can be grown in comparatively small pots, we would recommend caution, when potting, not to *overpot* them, as they are apt to turn yellow in the foliage and die off.

Specimens should be reduced at the root annually, and put into the same size of pot again with fresh compost, taking care not to hurt the roots when reducing the ball.

A very weak solution of guano and soot water may be given once or twice a-week, when the plants are making growth and in flower, with very beneficial results.

“DUNDONIAN.”



SCOTTISH HORTICULTURAL ASSOCIATION.

THE monthly meeting was held on the evening of Tuesday the 4th ult., in the hall, 5 St Andrew Square, Edinburgh—Mr M. Dunn, president, occupied the chair. There was an unusually large attendance. A paper was read from Mr John Cail, The Gardens, Inverary Castle, on “The arrangement of Trees, Shrubs, and Climbing Plants in Ornamental Grounds.” After a few remarks upon the growing popularity of these plants, which, he observed, was not without good reason, seeing that they possessed such a great variety of outline and beauty of form, the author went on to describe some of the principles necessary to be acted upon in order to insure success in their grouping in the pleasure-grounds. First of all, it was essential for planting to consider carefully the character and capabilities of the ground to be operated upon. The clumps should be laid out so as to secure a wavy or irregular outline—over-crowding to be carefully avoided; and in the dispositions of the various sorts in planting, care should be taken that each may have sufficient space to admit

of the development of its peculiar character. Regard should also be had to the contrasting of tints of foliage, without which some of the finest effects were liable to be marred.

A paper was also read from Mr Burns, The Gardens, Thingwall Hall, Birkenhead, on the "Acclimatisation of Plants." He defined this as the "bringing of plants from other countries, and endeavouring to naturalise or habituate them to our changeable and ever-varying weather," and describes some of the effects produced by light, heat, moisture, and elevation—contrasting the climatic conditions of this country with those of other regions, illustrating his remarks by giving accounts of experiments made by himself and others on the subject. The paper, which was full of instructive facts and suggestions, called forth a long and very interesting discussion, the speakers for the most part stating as their opinion that it was impossible to acclimatise or habituate a plant to a greater amount either of cold or heat than that for which it was naturally constituted.

Among the articles sent for exhibition were a number of plants of a new strain of Beet from Mr John Clark, The Gardens, Dysart House. These were very much admired, some of them being beautifully variegated, and others of the most brilliant crimson, quite equal in effect to the finest *Dracenas*. They had been in the greenhouse all winter; but if, as was stated, they are equally brilliant in summer in the open air, they will soon become popular as bedding-plants. It was announced that the Council had awarded them a first-class certificate. Mr Macmillan, Broadmeadows, Berwick, sent collections of *Zonale Geranium* and *Chrysanthemum* blooms; and Mr Buchanan, Penicuik House, had three branches of *Clerodendron Balfouriana*, with unusually large bunches of flowers, in full perfection. These, he stated, were taken from a plant growing in the border of an intermediate house, which had at present something like forty flowers of a similar size.

The Secretary intimated that five plans of kitchen-gardens and greenhouses had been sent in for competition for prizes offered by the Association to young Gardeners, and that the judges, after careful examination, had made the following awards:—1st, Mr Charles Warrick; 2d, Mr Webster—both of Dalkeith Gardens; and equal 3d to Mr Richard Parker, Hatton Hall, Guisboro', Yorkshire; Mr William Taylor, 17 Frederick Street, Edinburgh; and Mr W. H. Divers, Messrs Veitch's Nursery, London. These plans will be exhibited to the Association at its next meeting.

Reports on the weather at Broadmeadows and Dalkeith were submitted, from which it appeared that at both places the frost was most intense on the evening of the 14th December, the thermometer registering at the former 35°, and at the latter 22°.



Calendar.

KITCHEN-GARDEN.

WE have read more than once that it is a sure sign of a lazy gardener having the direction of a garden which is not in a high state of culture at this season—the ground turned up to frost and air, and every part of the ground as forward as spade, hoe, or rake can make it. However, we would be inclined to demur to such an accusation being laid to any gardener this season, even with a superabundance of labour-power (very few have enough of this commodity). In all the gardens we have seen this season there has been no opportunity of advancing work. First there was the wet weather, when well-

managed gardens were nearly destitute of vacant ground, being filled throughout with useful crops. Then came the frost, which kept the soil icebound for about nine weeks. The wet (middle of February) leaves every portion of ground soaked, so that it would be foolhardy to set a foot on the soil; and when it becomes dry enough for manipulation, the first work will be to clear off dead and decaying Broccoli, trim the rag-looking leaves from Brussels Sprouts, clear off all manner of litter and eye-offending material; so that if one is to be ready to take advantage of "March dust," garden labour must be

expeditiously carried forward. Manure will, in most cases, be wheeled on to vacant spaces, and preparation for cropping will now be the order of the day. Dry soil for seed-sowing is of much importance. Sowing thinly is a matter to be considered when free-growing crops are expected; and if seeds have been proved and found good, they should not be cast into the drills at random, but evenly, so that each plant will come up clear of its fellow—and thinning done as early as possible, so that crowding may be avoided. Covering of seeds deeply is often the cause of failure; replacing the soil over them in the drills when it is wet, battering the surface like mortar, is an evil to be avoided. In heavy wet soils, which go together tenaciously after rain, seeds of the smaller class do not vegetate readily; and where it is practicable, a quantity of dry soil, from potting-sheds or elsewhere, may be used with great advantage. Now is the time to make larger sowings of Peas and Beans—and better to do it every ten or twelve days than run any risk of an interval between the supplies. Two or three kinds may be sown at one time, choosing kinds to form successions, which come into use as others begin to decline in bearing. Some of the dwarf Peas, as Blue Peter, are useful for sowing between larger kinds sown in rows a good distance apart—the stakes of taller Peas affording shelter to many crops sown between the rows, as well as Peas and Beans. The last named are, as a rule, not required in large quantities, and sowings must be made in proportion to demand. Peas may be sown more thickly now than during the warmer months. In rich land, they do well planted in wide drills two or three inches apart. They branch out and give heavy crops of fine pods, and are less likely to be destroyed by drought or mildew: loose rich soil placed over the seed is of much advantage to them. A border for early seed may be in readiness: it should be deeply trenched, well broken, and a good dash of sand or light soil worked into the surface. If there are frames, hand-lights, sashes (which can be placed on bricks), or boxes covered with glass, to afford protection from weather and birds, such would reduce the labours and anxiety of cultivators; but such coverings are often abused by neglecting to uncover

the seeds when they require air and light in abundance. Nothing does well when coddled unnaturally. On this early border may be sown Brussels Sprouts, Cabbage (early compact kinds), Carrots (Short Horn), Cauliflower, Lettuce, Parsley for transplanting, Radish, a pinch of Savoy, Scotch Kale, Borecole, and a little Turnip may be tried, but it runs quickly to seed. A gentle hotbed answers well for Turnips, and also Carrots and Radishes. The latter will be coming on well for use where they were sown early in the season. Thinning may be necessary; but where they were carefully sown, the produce may be drawn for use as they grow. A pinch of Grange's, Snow's, and Veitch's protecting Broccoli may be sown for early autumn supply. Red-lead mixed with a little dry soil may be dusted over these seeds, to check the depredations of mice and other vermin. Celery may be sown under glass twice in the month; at end of month, a sowing may be made on a sheltered border and covered with a hand-light, or protected at night from frost by hoops and mats. Plants of Celery being brought forward for earliest crops under glass, such as pits or frames, must be kept in an even temperature—about 55°, or a little more—not drenched with cold water. Have air on every favourable opportunity, all the light possible, and in no way exposed to sudden changes of any kind. Drought to check the roots will soon drive the young plants to premature seeding. Beet may be sown in small proportions to give an early supply; but the main crops may be left till late in April, and to the beginning of May in warm southern districts. Deep, well-broken soil, not too rich, suits this root. Chillies may still be sown, and also the larger kinds of Capsicums. Those up and growing should be potted singly, to do them well. They require light and air freely when it can be admitted, but are easily injured by cold currents. Leeks may be sown in a bed for planting from into rich ground. Where circumstances will allow, they do well when sown in a well-prepared trench, heavily manured, and afterwards treated like Celery. Onions should not be out of the ground longer than possible, though we have sown them late in April with much success. They are

likely to be matured early when sown in good time. The same applies to Parsnips. Spinach may be sown between bushes, other vegetable crops, or in any spare ground. Good Spinach is never had from poor, shallow soil. Sow every eight or ten days: the plants soon run to seed, and are worthless. Tomatoes should be treated like Capsicums in their young stages. Keep them near the glass, and give them plenty of air. Pot them on to get strong plants for planting out under protection. It is now a good time to sow seed for planting out at end of May, where they can be grown out-doors, which is not often the case in cold northerly climates. Tomatoes which have been fruiting during the winter should not be cropped heavily, but have liquid-manure where roots are plentiful. Vegetable Marrows, to be grown on in frames and pits, may be sown at end of month, and kept growing evenly in moderate heat. So may also Gherkins and ridge Cucumbers. Rapid growth with these courts defeat. Crops of Potatoes in frames and pots may be brought forward with plenty of light and air, taking the lights right off (where such can be done) during mild days. Add a surfacing of light earth, and water when necessary with tepid water. Plant Potatoes of the early Kidney kinds on a warm, well-prepared border. Drills formed, and the tubers covered in them with light genial soil, is a good system for early crops. Peas may be planted from the boxes, turves, pots, or whatever they have been grown in. They should be well hardened to the weather before

they are turned out. A quantity of light rich earth placed with the roots when planted will help to start them. Stake them at once, and stick in some branches of laurels to break winds from north or east. Plant Cabbage in drills; also Cauliflowers on rich soils. The latter under hand-lights may be well surfaced with rich soil, or mulched with half-rotted manure and old turf chopped up. Those in pots ready for planting out should be gradually hardened, but not pot-bound. Keep up supplies of Sea-kale, Asparagus, and other forced produce, as required. French Beans will now bear freely. Water carefully, and give liquid-manure, clear and healthy, when they are bearing and roots plentiful. Attend to staking and surfacing, as may be required. Stakes and other requisites will be in readiness, as the frosty weather gave opportunity to prepare for the busy season. All preparations for new Asparagus, Seakale, and Rhubarb plantations may have attention. Manure well for these. Asparagus beds may be slightly forked over. Artichokes (Globe) may be much injured, and many killed: examine them, and prepare for new plantations accordingly. Jerusalem Artichokes may now be planted; also herbs of sorts, and Rhubarb, in rich soil. Forced Rhubarb may be hardened gradually, divided, and planted. No portion of the garden where crops are growing should remain untouched by prong, hoe, or other soil-cultivator. Sweet, wholesome surfaces are of much importance to crops.

M. T.

FORCING DEPARTMENT.

Pines.—Considering the excessive cold of the last three months, it is more than probable that the majority of early-fruited Queens that are usually past the flowering stage by the end of last month are only coming into bloom at the beginning of this month. Until they have set all their pips, the atmosphere should be only moderately moist, although there is not the danger now of their not setting well that exists earlier in the year. As soon as they begin to swell freely, the plants may be very lightly moistened three times weekly through a fine syringe at shutting-up time on

fine bright days. Now that the sun has more power, and the days are longer, the temperature may run up to from 80° to 85°, when the pinery is shut up with sun-heat. The night temperature may now be advanced to 70°; and with a steady bottom-heat of 85° to 90°, the fruits will make rapid progress. Water with guano-water at the rate of two ounces to four gallons of water, and keep the soil steadily moist. The rest of the fruiting Queens intended to ripen in succession to the earliest should now be subjected to the same temperatures recommended above. Should they

show the slightest tendency to grow instead of fruiting, give them no more water until they start than is just enough to prevent them from suffering. Late-started fruits of smooth Cayennes or any other winter sorts will now make rapid progress, and some of them may begin to colour by the end of the month. And at this season they should have very little water after they begin to change colour—at the same time do not let them become dusty-dry. If early autumn succers were not shifted into their fruiting-pots last month, lose no time in shifting them now. The soil should be placed in some warm place for a few days before it is used, and the balls of the young plants should be in a medium state of moisture at the time they are shifted. Plunge them in a bottom-heat of 85°; range the night temperature at 65° at 10 P.M., falling to 60° by 6 A.M. If the weather be sunny and the soil used rather dry—as it should be—the plants should be watered immediately they are plunged. When the weather is bright, give them a very light dewing overhead three times weekly with tepid water, when shut up early with a sun-heat of 80°, for an hour or two. Give more or less air daily, according to the weather, increasing it as the plants begin to grow. Examine later succers by the end of the month, and if well rooted and healthy, shift them; but if from any cause these have the soil deranged by such as worms or drip, it is best to shake them entirely out, repotting them into 7 or 8 inch pots, according to their size. All plants intended for starting about three months hence should still be kept quiet, only see that they do not become over dry at the root. The soil should be moist and nothing more, and the temperature 5° lower than has been recommended for fruiting-plants. Any portion of the stock intended for later fruiting, and that are now in 8-inch pots, should be shifted into 10 and 11 inch pots, according to the state they are in, and encouraged to grow as directed for succession plants.

Vines.—If all late Grapes have not already been cut and used or bottled, the sooner they are bottled the better now, so as to get the Vines pruned and kept as cool as possible for a time. All wounds made in pruning should be immediately seared with a hot

iron, and dressed thrice over with styptic, to prevent any chance of bleeding. All cleaning necessary should also be attended to, and all the dusty-dry part of the surface of the inside border removed, and replaced with a rich top-dressing, and the border thoroughly well watered. Early Grapes are later this spring than usual, owing to the severe winter. Owing to the amount of fire-heat that has been required, the foliage should be carefully examined for red-spider, and if any be found, let it be sponged off at once. Every advantage should now be taken of bright sunny weather to shut up as early in the afternoon as will run up the temperature to 80° for a short time, allowing it to drop to 65° by 10 P.M., unless when very mild, when it may be a few degrees higher. But it is better to do the forcing as much as possible by day, and keep moderate night temperatures. In changeable days the fires should not be allowed to become very low, so that sudden changes can be more efficiently met. If this early crop be in pots, they will now require much more water than for the last two months. Give each pot a dessert spoonful of Standen's manure, and if not already done, top-dress the surface of the ball with some rich manure. Permanent Vines now in bloom should have a slightly drier atmosphere for a few days, when the pollen is being developed. Give each bunch a gentle tap on its main stem; and where any shy-setting sorts are in bloom, they will be benefited by the application of pollen from freer sorts, such as Black Hamburgs. All superfluous bunches should be removed before the blooming period, and the berries thinned when of the size of sparrow-shot; unless, of course, in the case of shy setters, which should not be finally thinned until the stoneless berries can be detected. The night temperature for these should be 65° in mild, and 60° in cold weather. When the nights are cold and the pipes have to be slightly hotter, a gentle sprinkling of the floor of the house early in the morning may be necessary to prevent aridity; but, as a rule, we do not advise much sprinkling, except at shutting-up time on fine afternoons. Disbud, stop, and tie down the young growths in succession-houses. In the case of young vigorous

Vines, the tying down must be gone about with care; for if too severely brought down at one time, the growths are apt to give way at their union with the old wood, so that they require to be brought down by degrees. Muscats and Gros Colmans intended to ripen in September should now be started; and in doing this see that the inside border, where such exists, is well watered with tepid water if possible. The end of this month is a good time to plant young Vines raised from eyes last season. Shake the soil from their roots, wash them with clean water, disentangle the rootlets, and dash a handful or two of dry sand about them. In planting them, and where there is an inside border (as there ought to be in all vineries), spread most of the roots towards the back of the vinery, for the roots have a tendency to proceed outwards unless freely dealt with inside. After watering them well, keep the heat at 55° at night until they have grown two inches, when it may be raised a few degrees; but do not force an early growth out of them just now.

Peaches.—The night temperature of the early house should not yet exceed 55° when cold and 60° when mild; with a dull cold day temperature of 5° or 8° more. Syringe the trees with tepid water when the house is shut up, and let the temperature rise to 75° for a time. See that the inside border is kept moist; and if the trees be old and require stimulating, water alternately with guano and dung water. As soon as the fruit are stoned, 5° more heat may be applied. Thin the fruit to about one to 10 inches or a foot apart, according to the vigour of the trees. Very heavy crops of early Peaches are never satisfactory—unless, indeed, the trees be young and in the prime of vigour: two fine peaches are certainly to be preferred to three inferior ones. Look carefully over the young growths, and where it cannot be laid in without crowding, thin a portion of it out. Where the fruits are set and the size of large peas, go over them and carefully thin off such as are not in good positions, and where they are in clusters, always leaving the largest and best-shapen ones. Disbud all advancing trees by degrees, first removing all the front and back buds, ultimately leaving the terminal bud

and two or three nearer the base of last year's growth, according to the length and strength of that growth, and the room there is for young shoots: crowding is a great evil. Whenever greenfly appears, get rid of it at once.

Figs.—See that the early crop from trees in pots is carefully attended to with water, which may now be freely applied, as the growth is rapid, and Figs are greedy of moisture. Increase the night temperature to 60°, and shut up with sun-heat early in the afternoon, so that the temperature stand at 75° for a time, at the same time syringing the foliage and otherwise damping the house. Give air rather freely on fine days, to keep the young wood stout and fit to throw a good second crop. Pinch the point out of each shoot at the sixth or seventh joint. Remove all weakly growths that are likely to crowd and are not required to furnish the trees. Attend to later trees in inside borders in the way of disbudding growths that are not required, and keeping them steadily moist at the root. Now is a good time to start permanent trees for a first crop at midsummer and a second in autumn from this year's wood.

Melons.—Train the early plants to within 15 inches of the top of the house before stopping them. Water them sparingly until the lateral growths show fruit, and let the air moisture be moderate, especially in dull weather. Plant out succession plants, using a strong calcareous loam having no dung mixed with it. Dung is best applied as a top-dressing to strong soil. Those planted last month will be growing freely. Water moderately, and mould up by degrees, as the roots appear outside the heaps of soil. The night temperature may now be 70°. Give air early, and increase it by degrees till noon, and then decrease it gradually until the house is shut up, so that it stand at 80° for a short time, with a corresponding amount of moisture in the air.

Cucumbers.—See that those now bearing freely do not suffer for want of water, especially if grown with bottom-heat supplied from pipes, and without a layer of leaves and litter between the pipes and the soil. Water them with manure-water in a weak state; and if the roots appear on the surface, top-dress with equal parts

horse-droppings and loam. Examine the plants twice weekly, stopping young growths, and regulating and removing such as are not required, and all ill-shaped Cucumbers. Do not allow them to bear too many at one time, or it will weaken the plants. Range the temperature to about 70°, with 10° or 15° more on the afternoons of bright days.

Strawberries in Pots.—Thin off all blind blooms and small fruits from the trusses of those that are well set. As the days get brighter more water

is necessary, and they must never be allowed to suffer for want of it. A good plan is to fill pots half full of soil and place the Strawberry-pots in them; they root freely into the soil, and the pot shades the roots from the sun. The night temperature for fruit should be 65°. Plants in bloom set best at 55°, with a little air on all night. Put more plants into heat, according to the stock and room. By the end of the month place all the store stock in cold pots or orchard-houses, to be coming on gradually before being placed in warmer quarters.



Notices to Correspondents.

All business communications and all Advertisements should be addressed to the Publishers, and communications for insertion in 'The Gardener' to David Thomson, Drumlanrig Gardens, Thornhill, Dumfriesshire. It will further oblige if all matter intended for publication, and questions to be replied to, be received by the 14th of the month, and written on *one side* of the paper only. It is also requested that writers forward their name and address, not for publication unless they wish it, but for the sake of that mutual confidence which should exist between the Editor and those who address him. We decline noticing *any* communication which is not accompanied with name and address of writer.

D. P. M.—*Rhododendron Aucklandii*, one of the finest of the Indian species.

JAMES MOIR.—The young growths of your *Dendrobium* should be encouraged to come from the base of last year's growths, and not from their tops. To this end remove those from the top as soon as they appear, unless you want them for increasing your stock, in which case leave them till they begin to throw out roots.

'PLANS OF FLOWER-GARDENS, BEDS, BORDERS, AND ROSARIES.'—A correspondent will be glad to hear if any copy of this work is to be had. It was originally published by the proprietors of the 'Journal of Horticulture,' 171 Fleet Street, London.

HOT WATER.—Your boiler will heat all the pipe you propose to attach to it for *ordinary purposes*. For early forcing it would have to be fired vigorously.

L'ALLEGRO.—Summer-cloud can be supplied by Nurserymen—at least we have no difficulty in getting it from them. It is excellent for shading.

W. M.—We have noted the heading to the paragraph leader in our contemporary, but cannot act as you suggest. It is a *shocking* profanation and prostitution of one of the most solemn passages of Scripture.

THE GARDENER.

APRIL 1879.



THE LATE SEVERE WINTER AND A FEW OF ITS LESSONS.



THE past winter, and some of the lessons it has been calculated to teach horticulturists, will long be remembered. In some districts, and probably in the south-west of Scotland in particular, there is no record of cold so protracted and severe. For the sixty-two days of December and January there were 11° of frost for each day, and, including February, there were 9° frost for each of the ninety days of the three months; and while we write—11th March—the frost is not yet out of the ground.

Some writers have been reckoning up the injury done to vegetation by the very long period of low temperature, but we consider it even yet too soon to arrive at a correct estimate, vegetation being unusually late, and, until the sap begins to rise more freely under the influence of more sun, the results cannot be wholly visible. Common vegetables have suffered, to an extent that we have not witnessed or heard of in forty years' experience. We have seldom seen Roses so severely injured, notwithstanding the fine ripening effects of the last warm summer and autumn. Although the time has not yet arrived to determine it, we have a suspicion that Pear-buds are very considerably crippled; but as the full extent of the injury done to outdoor vegetation cannot yet be correctly estimated, we will turn to another department of horticulture, in connection with which some very forcible lessons have been given by such a winter.

In the early forcing department the effects of the long cold season have been most apparent in the slow and comparatively little progress of such crops as early Grapes, Pines, Peaches, Strawberries, &c. No doubt experienced gardeners may now be able to make up some of the lost time by a more rapid forcing pace. Though this may to some extent be a necessity, it is not by any means a desirable one. Beyond doubt, those who have attempted to force early Vines and Peach-trees, having their roots chiefly in outside borders, have reaped an experience that ought to demonstrate the absurdity of the theory held by some, that earth-heat is an immaterial condition. To force Vines, with their roots in a much lower temperature than the atmosphere of the vinery, is one of the most flagrant violations of the laws of nature, and to arrive at anything like thoroughly satisfactory results, by practically controverting these laws, is impossible. This subject has been warmly discussed at intervals, since ever we had any acquaintance with horticultural literature, and, perhaps, never more warmly than during the last twelve months. It is, in truth, remarkable that this should be the case. The marvel appears to us to be that more efficient arrangements have not long ago been adopted for affording more favourable, because more natural, conditions to the roots of Vines and Peaches that are forced throughout the winter months.

Covering up the borders in early autumn with non-conducting material to conserve the natural heat of summer, and the allowing of that heat first to escape, and—at midwinter when forcing is commenced—to force more heat into the border by means of a hotbed of litter and leaves, are the two systems pitted against each other by controversialists. In a certain way, and to a certain extent, these systems answer the end in view. But neither the way nor the extent are good imitations of the natural way. They are, however, in many instances, the only available methods. The objections to them are, in the first place, that they are laborious and very untidy; but our greatest objection is that the surface of the border is reduced to an unnatural state of soddenness, and the roots near the surface are very apt to be roots that are very easily injured when the mucky coverings are removed.

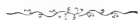
It is astonishing, now so many Grapes are forced early, that vineries are not erected on more correct and rational principles for this purpose. In the construction of early vineries and peacheries a much more efficient and natural way of preserving the natural heat of autumn in the soil, and of augmenting it at the proper time, should be provided for. This could be done much more effectually, and in the long-run at less expense, than by the cumbrous, untidy, and to some extent injurious, systems in common practice. The winter and

early spring heat necessary to the stems and foliage of Vines, which in summer is chiefly supplied by the sun, we supply by the best imitation of nature within our reach—namely, hot water; and we are of opinion that a modification of the same principle would be the most efficient and best way of affording heat to the roots that are not under the same roof with the stems. It may be asked, Why not have all the roots of early Vines in the vinery? That certainly would be a step in the right direction. But we have noticed, in a long experience, that Vines with their roots all inside a narrow border, have never been so satisfactory as when a considerable portion of them were in outside borders. And supposing that the roots are equally located in an inside and outside border, and that they do best so (as we believe they do), why not, now that glass is so cheap, efficiently cover the outside portion with a glass case, and run a flow, or flow and return, hot-water pipe through it. It would be the simplest thing imaginable to have a stout movable framework for the border of the early vinery, with a pipe attached to the inside pipes, that could be removed in summer—frame and pipe and all—with the greatest of ease. In midwinter the surface of this glass case could be covered with mats or frigi-domo, and, when the sun gains power in February and March, sun-heat could be shut and covered up in it, just as in the vinery itself. It may be argued against this that the border heats slowly from the top. We think this is an assumption, and nothing more. The natural heat of the earth in summer is surely the result of heat from above, as well as the prevention of radiation from a certain depth below the surface.

One of the greatest obstacles in connection with the early forcing of Pines, Vines, Peaches, Strawberries, Cucumbers, &c., which has no doubt been forcibly experienced during the recent severe time, is the lamentably unmethodical—we had almost said stupid—way in which the houses are too frequently arranged and placed in relation to each other; when, as is very often the case, all these crops have to be forced simultaneously. Even in many of the most pretentious gardens, the arrangements are what may be termed the most haphazard and inconvenient. The various houses are dotted about, just as if there had been a shower of them. Their relations with each other, and with the heating-power, could scarcely be more stupidly planned. In many cases the houses are widely apart; or, if nearer each other, they are often on different levels. Every one of these early forcing structures should be, if possible, in the same range: the floors and hot-water pipes in the whole should as nearly as possible be on the same level, where all, or several of them, are heated by one boiler. The heat can then, in a severe winter and spring, be much

more nicely balanced (as much by a judicious allotment of pipes as by valves) than when pipes from the same boiler are working at different levels. This is a principle far too much ignored in erecting forcing-houses. And we appeal to those who have had experience of forcing-houses at different levels, heated from the same fire, if the attendant evils have not been very conspicuous during the past winter, when hard firing had to be resorted to.

Small houses, necessarily enclosing a small or thin volume of air, are strongly advocated by some, as capable of being kept at a more equable temperature in cold, fitful, winter weather. A recent writer in a contemporary has laboured hard to prove this; but his demonstration appeared to us to be very lame and defective. Our experience, not to speak of anything else, has taught us the very reverse, and we have always found a small narrow structure fluctuate much more sensitively to the influence of cold or sun-heat from without. The principle involved we conceive to be the same as that by which a thin bar of iron, or a thin anything else, cools more quickly than a thicker one. We have for years cut Grapes and gathered Peaches in April from houses only 8 feet wide, and have done the same from much larger houses, and always found the larger ones more easily dealt with in the matter of steady temperature. And we consider no early vinery or peach-house, to be satisfactory in this respect, should be less than 16 feet wide; and we shall be disappointed if many early forcers have not verified this in the last severe winter.



EVERGREEN HERBACEOUS PERENNIALS IN THE PARTERRE.

THERE is a very numerous class of hardy perennials with evergreen foliage which may be used in the flower-garden with good effect in summer in conjunction with the usual classes of summer bedding-plants. A more general introduction of the hardy perennial classes of plants with evergreen or persistent leaves with the varied tones of green, grey, white, yellow, and bronze, which they offer at all seasons of the year, would, I think, be a step in the right direction in many cases. Individually, even in pots or in small patches, many of the species which I allude to, and which I will particularise more fully further on, are very attractive at all times; but in masses of some breadth, or broad lines or bands, they would be still more so. Much of the difficulty that is experienced in mitigating the evils of empty beds and borders in winter would be done away with if suitable hardy plants could be found that may be adapted to the style of bedding-out that finds most favour with the flower-gardening public at present. I think there is no difficulty as to the plants—they are plentiful, and may

easily be obtained by the thousand if the demand is raised, as the various kinds that are suitable may be increased by the simplest means *ad libitum*. Not a few of the class to which I invite attention in this paper are already employed in the parterre in summer in various ways. Carpet-bedding has drawn a few of the more suitable forms of *Sempervivums*, *Saxifragas*, and a few other hardy perennials into service with excellent effect in that style of garden decoration. In geometrical designs two hardy plants of similarly adaptable habit of growth are successfully introduced, with perfect harmony alike with the design and the gayer classes of plants more commonly employed for the summer furnishing of the flower-garden. An old familiar plant, such as Pennyroyal (*Mentha pulegium*), only requires to appear with its leaves tinted golden instead of green; or the pretty but weedy Stitchwort (*Stellaria*) to assume the same hue instead of its pale grassy green, to become the pet plants of the period with flower-gardeners. Neither of these is in the category which I am considering. They are not evergreen, or rather ever-yellow, to such a degree as to render them commendable for the purpose of clothing the bare surface of the earth in winter; but being familiar plants to flower-gardeners, their habit of growth will serve to illustrate a considerable number of the species and varieties of hardy plants which I should like to see more generally employed in the way spoken of. There cannot be any objection to the introduction of plants of similar habit to these, if only they can be proved to have colour sufficiently distinct and pronounced to aid in producing a contrast or pitching a harmony with something else. Well, the proof will be more or less difficult just according to the depth of the prejudices of those who address themselves to the weighing of it. But those who are in earnest about the improvement of flower-gardening, and about getting the largest amount of pleasure at all seasons of the year from the flower-garden as a result of their efforts and outlay, will have few prejudices to overcome: they will test and try and judge all subjects that may be brought before them on their merits. This is exactly what I should wish to see done with many of the plants which I shall name and briefly describe before I close this paper.

The styles of flower-gardens to which I consider the class of plants in view best adapted are terrace-gardens, where either box or stone edgings are used, or panelled ones, in which the design is viewed from a greater or less elevation, and which are based in gravel-walks or deficient in surrounding masses of green. Being all plants of a neat compact habit of growth, which will be improved by the close attention, in keeping to which they would be subjected in the flower-garden, they are capable of being worked into any design, no matter how intricate. The perfection of the summer keeping would tend to enhance their beauty in winter. It is only when they are allowed to degenerate into untidy condition that many of the neatest and prettiest of the ever-

green alpine and other dwarf-growing evergreen perennials become unattractive in any position in which they may be placed, and this untidiness leads to their becoming patchy and rusty in winter.

I will now proceed to give a list, with slight descriptions of the species which are best adapted to the object in view. The list will be more suggestive than exhaustive, the aim being to present a few of the best only.

Aubrietia, in some variety as regards the size of the leaves and vigour of growth, and somewhat also in the particular shades of green which the several forms present, are very neat pretty plants with their leaves arranged rosette fashion. They are of spreading, yet close-carpeting habit, and when well attended to in the matter of trimming and equalising their growth during the growing season, they make a very pleasing soft carpet of green. These are favourite plants with many for spring bedding, and are very beautiful for three months in favourable weather, clothed as they are during that period in the beautiful purple and deep lavender flowers that they severally present. This is a consideration that may be objectionable in the flower-garden in the way in which I wish to recommend these and other subjects of similar character, except it be utilised by placing next to it something that would contrast or harmonise with it in its flowering season, which is often prolonged into June, and therefore into the earlier part of the summer display. The variegated form of *A. deltoidea* is one of the most attractive of minute variegated plants at all times, and is particularly beautiful when in flower.

Arabis alba and **alpina** are considerably larger growers than either of the *Aubrietias*, but in general style of growth they are similar. They are by no means so neat, but by careful trimming and annual renewing of the stock by means of cuttings, they are trim plants of three or four inches in height. The former is the stronger of the two. Both have their leaves in rosulate tufts at the extremities of the branches, and they are of a light hoary green. They are splendid plants for spring flowering, continuing from March till June. Considering the profusion and long continuance of their display, it may reasonably be wondered why they are so seldom met with in use as spring bedders. There are variegated forms of both, but *Alpina* is the best of the two, both in the normal colour and variegated.

Arabis lucida has a variegated form which is one of the most beautiful of all hardy variegated perennials. It is somewhat difficult to keep, but is worth trying to keep, being always fresh and attractive. The plants should be propagated from cuttings, annually renewing the stock in the beds every spring, or at bedding-out time. A dry, moderately light soil suits it best; but extreme drought is inimical to its wellbeing. The flowers should not be permitted to develop in this form; they weaken the plant much, and very often lead to its destruction; they are, besides, in no sense ornamental.

Iberis corifolia.—This is one of the dwarfest and most beautiful of the genus. The foliage is of a deep olive-green colour, and if propagated by means of cuttings annually, no more compact plant can be imagined,—the flowers pure white, in compact, rounded umbels. In all respects it is the finest of the genus. Any of the Iberises may be employed in the way proposed, and should be propagated annually for the purpose. The flowers, if objectionable, may be cut away, and the freshness of the foliage will be enhanced thereby. They are all dwarf plants, not exceeding four or five inches high in the foliage line. They vary slightly in height when in flower.

Stonecrops (*Sedums*) offer numerous green and glaucous species which are attractive during the winter, as they also are in the summer months. Amongst the best in colour and habit are—*S. album*, which mats and clothes the surface of the ground with its numerous stems, thickly set with bright brownish-green leaves. The flowers are white, supported on stems about six inches high, forming dense masses about June and July. *S. anglicum* forms tufts of lively-green, dwarf, and mat-like flowers—white, often tinged with pink. *S. rupestre*, having larger leaves and a more robust habit than either of the foregoing, is yet very dwarf and compact,—the leaves a glaucous tint, which is very pleasing. The flowers are bright yellow, and appear in July and August in terminal clusters. *S. sexangulare* is a deep, slightly rufous-green in tint, and is closely matting in habit. The flowers are yellow, appearing in early summer. *S. spurium* is quite distinct from any of the preceding, particularly in regard to the form of its leaves, which are flat and roundish, or wedge-shaped and toothed. It forms flat tufts. The colour is bright-green, and somewhat glaucous. The flowers are rosy-purple, borne on decumbent stems a few inches high.

The flowers of these may be objectionable to many, and those of some of the species are not worth being permitted to develop themselves on the ground of any very striking beauty they possess. But that objection applies equally to certain others of the numerous bedding-plants which are in use with variegated or glaucous leaves. The flowers can be cut away, and the foliage effect will be enhanced thereby.

Saxifragas, in the mossy and silvery-leaved sections, present a rather numerous list to select from. The effect of both in winter is beautiful, especially in gardens where gravel and stone-work abound. Some of the mossy section are peculiarly bright in winter, when they are managed so as to prevent their becoming patchy. They should be planted every year in order to keep them compact and smooth; and at any time during the growing season they may be attended to in the matter of making good weak spots, so that a fine even surface may be constantly maintained. *S. aizōa* is one of the silvery or incrustated-leaved class. The leaves are short, blunt, and arranged in rosettes, which, like most of this class, are liable to become tufted and uneven if they are not annually divided and replanted. *S. cæspitosa* belongs to the mossy

section, is more disposed to become tufted in the course of a year's growth than some others, and therefore requires a little attention in order to keep it smooth. A little pressure with the hand or foot, applied occasionally to the centre of the tufts when they begin to assume a tendency to become uneven, will put all right. *S. crustata* belongs, as the name implies, to the incrustated group, and is similar in character to the first named, and requires similar treatment. *S. hypnoides* belongs to the mossy section: it is less inclined to become tufted than *cæspitosa*, but will require some attention in that respect in order to keep it neat and dressy. It is, perhaps, the best of the mossy section for the purpose in view, being compact in habit, and of a very pleasing lively colour. Similar to, and indeed closely resembling it, are the sorts grown under the names *affinis*, *decipiens*, *hirta*, *incurvifolia*, and others which, by botanists, are regarded as only slight variations from the typical form of the species. *S. ligulata* belongs to the incrustated group. The leaves are narrow, and form very neat and pretty rosettes, assuming a very bright silvery tint. It is, in fact, a miniature of the next species, and only suitable for margining small beds and clothing small circles with a silvery mass, in the centre of which some contrast in colour and habit may be put. *S. longifolia* is one of the handsomest of the section with crusted leaves. It has been called the queen of Saxifragas. Others might dispute its title as applying collectively to the genus, but it is indisputably the queen of the section to which it belongs. When well cultivated, this beautiful plant forms leaves of considerable length, and rosettes of perfect symmetry, seven or eight inches across. Left to itself, it is apt to become tufted and rough, but if divided and replanted annually, it forms one of the most attractive carpeting plants imaginable. *S. cotyledon*, another of the incrustated species, better known in one of its forms as *pyramidalis*, is larger leaved, and forms larger and bolder rosettes. It requires the same attention in regard to annual dividing and replanting as the others of this section. There are a few other incrustated species and varieties which may be used—any of the section being adaptable to different purposes and positions in the way contemplated—but it is quite needless to describe them. They all require similar treatment.

Sempervivums offer a few distinct forms which are already well known to flower-gardeners as amongst the best subjects for carpet and geometrical bedding. *S. californicum*, *tectorum*, *montanum*, being three of the larger growers; while for small or narrow lines and beds, *flagelliforme*, *soboliferum*, *arachnoideum*, and *arenarium*, are very neat and pretty.

Thymus.—Among the Thymes there are some very pretty plants for our purpose. One of the best, *Thymus lanuginosus*, forms a close, densely-spreading carpet of hoary purple foliage, clothed with fine hairs, which impart the colour that is so attractive in this variety. *T. azoricus* takes the form of close, lively-green cushions, which will re-

quire compressing in the centres in order to keep them smooth and even when used in the way I suggest. *T. citriodorus aureus*, the Golden Lemon Thyme, is one of the prettiest plants in summer or winter which has been introduced in recent years.

Such are a few of the many things that might be used with good effect in the flower-garden. If they are handled with taste, there can be no doubt as to the pleasing results which might be obtained, even in summer bedding; while in winter the fresh green and glaucous and other tints of colour which would remain would be a gain obtained at small cost.

W. SUTHERLAND.



A VISIT TO THE THOMERY VINEYARDS.

SOME 45 miles south of Paris, on the Paris and Marseilles Railway, the train lands the traveller at the secluded little station of Thomery, lying on the skirts of the great forest of Fontainebleau, and only a few miles beyond Fontainebleau itself, with its palace and gardens and fine scenery, so that the traveller may visit both on the same day if he chooses. There is nothing about the little wayside station of Thomery, with its single porter, to lead one to suppose it is the centre of any important industry, though we are assured that it despatches twenty or thirty thousand pounds weight of Grapes daily to Paris during the autumn months. French railway stations are, as a rule, mean-looking structures compared to those in England, and their sanitary arrangements and other conveniences are simply detestable, and this applies to the large stations in Paris as well,—at least to the older ones. St Lazare Station is clean and pretty, and is decorated with flowers like a drawing-room, and the Station du Nord, where English travellers are always arriving or departing, is fitted up more in accordance with English ideas, but the less said about some others the better. An Englishman in France, if he wishes to judge the people charitably, in some things, had better keep the motto "*Honi soit qui mal y pense*" continually before his mind; but do as he may, he is apt to think that French civilisation is very much made up of "tops and bottoms." This, however, is by the way.

The village of Thomery lies about a mile and a half from the station, and a very good bit of the forest is traversed between the two—the trees, oak chiefly, standing thickly together like seedlings in a hotbed. Almost as soon as one emerges from the dense shade of the wood, he finds the road bordered on one side by Vine walls, and on the other by a rough fence, over which the field Vines scramble in a semi-wild state, like Blackberry bushes, and down in the valley below lies the village surrounded on all sides by Vineyards—some small, and

some large, and all enclosed and sub-divided by low mud-built walls, on which the Chesseles de Fontainebleau Grapes are grown, the fields being cropped with the commoner wine producing sorts, upon which comparatively little pains are bestowed. Far out of the village the walls are clothed with Vines and Pear trees, trained in the most perfect and methodical fashion, and bearing heavy crops of fruit. The Grapes were not ripe at the time of our visit, early in August, but the Pears were ; some sorts had indeed been gathered. The trees were not protected in any way, though the fruit was hanging temptingly ripe within arm's-length of the highway ; and the border in which the roots of both Vines and Pears grew was only about 2 feet wide, and was supported by a dry stone wall built along the roadside. A group of whitewashed buildings, a little way from the road, looks very much like a Scotch farm-steading ; but a peep within the enclosure shows that the arrangements and appliances are of a different order, and relate exclusively to the culture of the Vine. The walls of the court, the dwelling house, and sheds, &c., are all covered with the Chesseles de Fontainebleau (Royal Muscadine) Grape, and at a glance one can see that every shoot, and almost every leaf, is trained in its allotted space, and all the laterals stopped and pinched as if they had been newly gone over. It is the same in the village. Every wall appears as if it had just been newly white-washed, and every cottage on south, east, and west exposures, is covered with a mantle of green Vine foliage, under which the bunches hang in profusion, literally touching each other in some places. Every bit of available space is utilised, and not an inch more growth is permitted than is necessary to the successful fruition of the plant, which is cropped as heavily as it will bear. An English gardener is rather disconcerted at the appearance of the "Vine borders" in front of the houses—the border is the street, and is paved with large boulders right up to stems of the Vines. Yet both wood and foliage are remarkably good and clean—scarcely any trace of spiders or mildew to be seen,—and the leaves large and leathery, and of a substance never seen on an English Vinery. Of course, the thrifty cottagers simply utilise their walls in this way, and attend to the training and general culture of their Vines in the evenings ; just as the English cottager looks after his Potato plot and garden when his day's work is done.

In the Vineyards proper, devoted to the culture of dessert Grapes, Vines are trained to low walls from 6 feet to 10 feet high, and coped with brick tiles, the parallel strips of ground between the walls being devoted to the production of common wine-producing Grapes chiefly ; some of the better sorts are also trained on espaliers on the open ground. M. Rose Charmeux, is one of the principal cultivators in the district, and his handsome residence, something like a gentleman farmer's in England, is a prominent feature in the village. The proprietor himself was in Paris acting as a juror at one of the fortnightly

shows in connection with the Exhibition, at the time of our visit, but his foreman, whom we found engaged trimming in some beds of *Coleus* and *Begonias* growing rampant in front of his employer's house, courteously showed us all that was worth seeing in the establishment. There is nothing in the culture of the Vine at Thomery that particularly arrests the English Grape-grower's attention, unless it be the skill and method displayed in the training of the Vines, so as to get the greatest amount of fruit from a given space, combined with the cheap and simple, not to say primitive, but perfectly effective appliances employed to meet the end in view. There can be no doubt, we think, that the French excel us in making the most of means and appliances. Where we spend money they spend extra labour and attention, and with better and more constant results. This fact forces itself upon the stranger at once.

The winter of the north of France is more severe than in this country, as is indicated by the single fact that the *Auracaria imbricata* is not hardy there, and consequently not planted as an ornamental tree, and the spring frosts are also severe, yet we are assured that the Vine crops at Thomery seldom or never fail although the protective appliances—old-fashioned copings and sheets—are much the same as those used in this country fifty years ago or more. Expensive patent glass copings and suchlike are unheard of. Brick, deal, and plaited-straw copings, 9 inches or 1 foot wide, were shown at the Paris Exhibition, but no glass ones, by French makers at least. Our settled conviction is that there is nothing to hinder dessert Grapes from being grown in the south of England just as successfully as at Thomery, and with the same means, if the cultivator would take the same amount of pains in their culture. Crops would undoubtedly be a little later in England, but not much, and it is perfectly possible to ripen Grapes after the autumn frosts set in. The Muscadine ripens in August and September at Thomery, and on espaliers later; but behind M. R. Charmeux's house there is an archway or covered walk, planted entirely with Black Hamburgs, or Frankenthal, as it is called there, which we were informed ripened a crop in October. Under this archway the bunches seemed to hang as thick as leaves, and were all hand-thinned. The spur system of training, in some form or other, is generally adopted. When the Vines are trained vertically, they are planted 16 inches apart and the shoots are mostly trained from one spur, 8 or 9 inches apart, and as often as otherwise the shoots bear two bunches each, about half a pound in weight. It may therefore be guessed how heavy the crops are. We have heard of 40 lb. to 20 feet rods in this country, the canes being trained 4 feet apart, but the Thomery growers exceed this in some instances, as regards the Vine rod, and generally we should say as regards space. On one young Vine of Foster's Seedling, which is becoming a favourite for wall-culture, we counted 18 bunches on a rod about 5 feet long, and we estimated the bunches at a pound weight a piece; some

of them would be 2 lb. Indeed we never saw much finer bunches of that variety. In flavour it is not so good as the Muscadine, but its cropping qualities are a recommendation. The Vine that bore the above number of bunches had just a strip of wall 16 inches wide allotted to it like the others. No doubt the hardier constitution acquired by the Vines, both in leaf and bunch, enables them to bear such heavy crops. The wood of the Vines was brown and ripe to the ends of the shoots when we saw them, and a portion of the leaves had been picked off to allow the sunshine to get to the fruit to hasten its maturity. After the fruit begins to turn, this practice is not considered to be injurious in any way to the health of the Vines. The soil of the Vineyards is a brown flinty-looking compost, and varies in depth from 18 inches to several feet, and the surface where the roots of the Vines are, is mulched with decayed manure or litter. After the Grapes have been thinned, early in the summer, the after-culture consists almost wholly in training the shoots and pinching the laterals, the last being done by women who nip the shoots off with their fingers. The espaliers and bushes in the open quarters are not so particularly looked after apparently, but on the walls the laterals appear to be pinched as fast as they push, after the first stopping, little or no growth being permitted beyond the fruit, the exigencies of space demanding that every shoot be kept strictly within bounds. As to the quality of the Chesseles de Fontainebleau Grapes, they are certainly superior to the same kind grown under glass at home, being well coloured, sweet, and of good flavour, very much superior to the foreign Grapes usually sold in this country during the autumn and winter.

We may state in conclusion that we enjoyed our visit to Thomery very much, and were well rewarded by what we saw, and we think no gardener should leave Paris without visiting these famous Vineyards ; it will at least be a new experience to him as it was to us, and in the pleasant little Vine-clad village of Thomery, with its well-appointed but old-fashioned French country inn and quaint church, and its general surroundings, he will find much to interest him besides Grape-growing.

J. S. W.



CULTIVATION OF GARDENIAS.

WITHOUT doubt the Gardenia as an evergreen stove-plant stands very high in popular estimation, and is very highly prized by ladies for the sweet fragrance its flowers possess, as much so as the Rose, the Eucharis, and others—and more especially because it can be brought into bloom in autumn, winter, and spring. Although its flowers are only of short duration, they do not all open together, which makes them the more useful, as a large plant will continue to open blooms over a period of some weeks. With a number of

plants, and care and forethought exercised in preparing or retarding them, as the case may be, the blooming of Gardenias can be extended over seven or eight months, provided a sufficient number of plants can be cultivated, and the plants are prepared for the various seasons. The natural blooming-time, if under ordinary stove treatment, will be through March, April, and May. To produce them in early autumn takes considerable time, more room, and a large number of plants to work upon.

The Gardenia is subject to all kinds of insects which infest plants, and if every attention is not paid to keep it thoroughly clean, much trouble and annoyance are caused, and in the end, instead of a crop of fine flowers, the cultivator reaps disappointment. This is perhaps the reason why the Gardenia is not more largely grown in some private places, especially where plant-houses are badly infested with mealy-bug, scale, and other insects, which seem at once to arrest the growth; and but little success can be anticipated. When out of flower, well-grown plants in exuberant growth are beautiful to look upon, on account of the dark glossy foliage which is so characteristic of the plant when in good health.

The propagation of Gardenias can be effected at almost any season of the year from cuttings. These are by no means difficult to strike from the ripened wood. We, however, prefer striking about August from half-ripened wood, as this leaves the whole of the following year before us to start early in the season and grow the plants as large as possible. The cuttings are best inserted singly in small pots in a mixture of peat and sand, and plunged into bottom-heat until rooted in the propagating house or frame. If practicable, a little bottom-heat should be applied through the whole season up to the end of August. This will make the plants grow more rapidly, and produce nice bushes in 6-inch pots, if properly attended to in the way of watering, potting, stopping, and shading for a few hours during the hottest part of the day. In potting, the pots should be carefully drained, and a little moss, or a portion of the roughest part of the compost, laid over the crocks. The compost we find most suitable after the young plants are rooted and require larger pots is a rich fibry loam and peat, using a 6-inch potful of bone-dust to every barrowful of soil, and a good dash of sharp silver-sand to make the whole porous. The soil should be pressed firmly into the pots. Keep the house or pit in which they are growing close until they have taken to the new soil. The atmosphere should be moist, and the plants well syringed overhead. If the plants are plunged, and the soil in moderately moist condition at the time of potting, the plants will not need watering, at least for a few days, which will

give the fine roots of the Gardenia a chance of recovering from the damage received in potting. However carefully this operation is performed, it is next to impossible to do it without the roots receiving injury more or less; and if watered, which is too frequently done, the roots have not a fair chance of starting quickly into the new soil.

Avoid the too common practice of using a sharp-pointed stick to liberate the roots from the ball of the plants. In potting ever-green stove-plants—especially such fine-rooted subjects as the Gardenia—the crocks only should be carefully removed, and any little loose soil from the top of the ball. The new soil should be pressed firmly round the sides of the ball, so that water cannot pass through it and leave the old ball dry; the roots will enter the new soil freely enough, provided this is carefully done. The slaughtering system of using a sharp-pointed stick to set the roots at liberty cannot be too strongly condemned, as we believe more plants have to be conveyed to the rubbish-heap through this than any other cause, especially fine-rooted plants such as Heaths, and this caution applies with equal force to the Gardenia.

If the young plants are required to bloom the first season, they should not be stopped after August, but allowed to extend their shoots, and be grown from that time with a little more air. Under these circumstances the young plants will soon complete their growth, and form flower-buds, averaging from eight to ten blooms to each plant, which will come out during March, or earlier if brought on rapidly in a brisk heat after the buds are set. If the object be to grow the plants into a good size as quickly as possible, they should not be allowed to bloom, but be stopped later than the time named to prevent cutting the young growths back, and again get an early start the following year. If allowed to bloom, and two or three months are lost at the commencement of the year, a much longer time will be required to get the plants into a good size. It is best to sacrifice the bloom the first season; and after the commencement of the year, and root-growth has fairly commenced, they should be transferred into 8-inch pots, using the compost already recommended, and be grown on rapidly under the same conditions as described above. The plants will this season make rapid strides, and be ready by the end of June or beginning of July to be transferred into 10-inch pots, provided every attention recommended has been carried out. They should be again kept close until they have taken to the new soil. As soon as the roots are working freely into the new compost, any shoots that require stopping should be attended to, and then grown on rapidly under the influence of plenty of light and

sufficient air to cause their growth to be short, and possess that solidity which is requisite for a good set of flower-buds. A good set is certain—such as will well repay the cultivator for the sacrifice of the previous season's blooms.

This second potting in the year will not be necessary after the plants have attained a fair size and in 10-inch pots. Unless the object of the cultivator is to get them into a very large size as quickly as possible, 10 and 12 inch pots are large enough for all ordinary purposes. When transferred into the last-named size they can remain in them for several seasons, if supplied with a little manure-water while making their growth and swelling their flower-buds, at which season we think the feeding most necessary. Nothing is better than an occasional application of clear soot-water, which acts immediately on the plants, and imparts a beautiful glossy colour to the foliage. Plants can be kept in smaller pots under the same circumstances if deemed necessary.

The time of potting varies according to the time the plants are wanted to flower. Some cultivators prefer potting as soon as the blooming is over. We would recommend this operation to be carried out as soon as they commence to set their flower-buds. At this time they always unfold a quantity of leaves, and the roots are active and soon take to the new soil. The plants, after blooming, are ready to be cut well back, and will start at once into vigorous growth without being again disturbed.

In training the plants, the foundation must be begun early by bringing the shoots down to the rim of the pot, if nice round bushes are required, which can afterwards be easily kept in shape by stopping and regulating the shoots as they grow. When they have become large plants, they can be cut into shape with the knife after blooming. We cannot too strongly condemn the mode of tying and twisting the shoots of the plants into the form of pyramids and other shapes, looking as if they had been clipped into shape with a pair of shears, instead of using the knife at the proper season. We allude to this especially because the plants are so subject to all kinds of insects, and the great difficulty experienced in keeping the plants clean. If the growths are twisted and tied closely together, the plants do not show off their flowers so well, nor are they so natural-looking as if grown into nice round bushes, without either tie or stick, after the foundation of the plants has been formed.

A system we have found useful for growing plants suitable for small vases, &c., is to strike the cuttings in early spring in small pots, and then pot into 4-inch pots when rooted, keeping the plants well stopped and close to the glass on a shelf: by so doing the plants will

be very dwarf and produce about four blooms each. Another system we have adopted with success—viz., striking four or five cuttings in a small, say 3-inch pot, as soon as growth is completed and it can be seen which shoots are going to bloom. Care must be taken that they do not again start into growth after taking root, until it is seen that the flower-buds are swelling ; and then the growths, if they start before the blooms expand, are better picked off.

NORRIS GREEN.

WM. BARDNEY.



PLANTING SHRUBS.

THE planting of forest trees and shrubs, where such work has to be done, will be continued to a late date this spring ; for while we write, the frost and snow have only just gone, and it will require some days of dry March winds to fit the soil for satisfactory working. The month of April is, however, not by any means the worst period to remove and plant evergreen shrubs. We have just inspected a great quantity of large Hollies and evergreens, which were transplanted last June, and all have grown successfully. Most evergreens are exotics, and many require the average temperature of the season to rise considerably before their vitality is sufficiently aroused. April is the month for Hollies and for Conifers of all sorts to be moved ; and the time which suits these must, of necessity, not be bad for other evergreens. We, in common with many more, have been obliged to defer planting of all kinds ; and now, when the frost has gone, and on looking over our stores of trees and shrubs, we find them in quite a different condition from the fine, robust, healthy looks which they wore on the 1st of November last. Very many, such as large old trees of Sweet-bay and Arbutus, seem as if a hot blast had passed over them,—many killed, and many more paralysed. Many have lost foliage more or less : in fact, to note the various degrees of injury is simply to register the degrees of resistance or hardiness of the various subjects. Now, in the face of the general shock to the vitality of the shrubbery stores—for all are more or less damaged and convalescent—we have been obliged to modify our plans for planting very considerably. We ask ourselves the question, Can we dare to move those Escallonias which seem hesitating between life and death ? can we move those Deodaras whose bare twigs look more like those of the Larch, and are evidently very much enfeebled ? Even the green Hollies are throwing down their foliage in showers. Would it be judicious to add the additional shock of tearing them up by the roots and replanting them ? Laurustinus also, which is a very doubtful plant to remove

after frost, will look tolerably well for a long time, but ultimately die off in patches. Planting must, however, be done to some extent; and we have already ventured on many Hollies from 20 feet high and downwards; but it must be expected that a large percentage of deaths will ensue, let the work be ever so carefully done, simply on account of the debilitating effect of the hard winter. March planting is hazardous at all times, from this as well as the above considerations. It would be judicious where possible to postpone the work until April, to give time to the shrubs to recover themselves. Of course hardy deciduous trees and shrubs are an exception. On them the winter has had no bad effect whatever. Striking proof of this was discovered in cutting down a variety of trees and shrubs while the frost was barely out of the ground, though the atmospheric temperature was comparatively high. The sap literally poured out of the prostrate trunks as well as the root stocks of Walnuts, Chesnuts, Laburnums, Lilacs; while the wood of large Holly trunks, Portugal Laurels, evergreen Oaks, and such like, was quite dry, and even withered in appearance. We do not recommend April planting as a makeshift under existing circumstances. Some of the most successful planting of large evergreen shrubs, both large-foliaged and coniferous, we ever made, was done in April, and under exceptionally hot weather. The growth of everything was on the move; and although the distance was not inconsiderable, the time which elapsed between lifting and planting was allowed to be as short as possible. Copious watering was immediately given. Large-foliaged plants flagged for a time, just as Cabbage plants would, or bedding plants, under a hot sun in May, yet scarcely a death occurred except in the case of some large Wellingtonias, and this was clearly attributable to deficient watering. There seems no reason why shrubs should not be managed as bedding-stuff, planted and watered in the same way and at the same time. Hollies make fresh roots with amazing rapidity under a hot sun, with plenty water. The greater the activity of life the greater the chance of success, and *vice versa*, for Hollies are proverbially ticklish to transplant in midwinter.

The success or otherwise of all planting is influenced to an extent seldom sufficiently appreciated, by the nature of the soil or the care with which it has been prepared. A heavy soil, stiff and cold, newly trenched or dug, or not dug at all, will in its conditions be scarcely recognisable with the same soil if turned up months ago, and reduced and mellowed by the frost. Where such a soil has to be dealt with, and where timely trenching has not been performed, it is absolutely necessary that a friable mellow soil should be imported, into which the roots of the plants must be laid, and with which they

must be covered ; and this is even more necessary under the present condition of most shrubs. Fresh soil for planting all sorts of trees and shrubs, as well as fruit-trees, should be of the simplest kind. Plain maiden earth of a loose friable nature is much the best. Composts of all sorts should be avoided in the planting of trees, especially mixtures with leaf-mould and vegetable remains, however much the temptation may be to its use from convenience or availability. The compost heap has long been a favourite institution, and it has had its day : it is still useful as a material for top-dressing, but as an appliance immediately to the roots of trees composts are positively dangerous. Deep planting must also be avoided : it kills many a tree but stunts many more. Many skin-bound stunted trees planted on good sites, and with an abundance of kindness, remain a puzzle to the owner why they should refuse to grow, when failure is entirely due to deep planting. An old practitioner and friend used to say, Give them a good hold of the soil—it steadies them ; and he goes on to this day steadying them, and the growth in his plantations is steady also. Deep planting saves labour in stakes ; and this appears to be a consideration with many. When a good deep hole is made, and the ball of the tree or shrub, or the roots without the ball, is lowered some 6 inches below the surface, and the soil filled in and heaped round, and finally trodden, our tree is in an excellent condition to resist the loosening effect of the wind ; but here the benefit ends. Roots, like many more living organisms, have a dislike of being buried alive. The question of staking is itself an important one, notwithstanding its apparent simplicity. Tall plants often get literally sawn through by the cord which ties them, or by chafing against the top of the stake. A favourite plan, and one which has the advantage of sightliness and cheapness, is to drive three pegs of any rough timber into the soil, at more or less distance from the root of the tree according to size, and from a band of straw or hay round the tree, at a convenient height, tie three pieces of tar cord to the pegs. The cord is cheaper than single stakes, and much more effective.

THE SQUIRE'S GARDENER.



MARIGOLDS.

ONE would fancy that of such old-fashioned common flowers as the French and African Marigolds there would be very little to say. Nor is there much. Only, as the scope of 'The Gardener' is not restricted with regard to the subjects discussed, and as I know that a good strain of these well grown commands a good deal of attention

from the flower-loving portion of the community who visit gardens, I have therefore thought that a note on their culture would not be wholly out of place.

And first as to raising the plants: I sow about the middle of April in a cold frame in which a bed of soil is prepared, and the seeds are thrown broadcast over the surface thereof, and merely pressed firmly in without further covering of soil. The sashes are kept closed, and covered with mats until the seeds have germinated. The mats are made use of thus to secure partial darkness to the seeds, and also to preserve a uniform amount of moisture in the soil without having to apply water. When the young seedlings appear both light and air are freely admitted, and when weather permits the sashes are entirely dispensed with. The seed is sown very thinly, and the soil is of a light and rich nature; so that, while it is not necessary to prick out the seedlings before transplanting them into their "blooming" quarters, the nature of the soil allows for this being done without destroying the roots of the plants, and consequently without their receiving a check from the operation. When slugs abound, larger plants than these thus grown might be found to do better, as slugs have a great liking to young Marigolds. Sowing a little earlier and keeping the plants warmer would be necessary in such cases, but otherwise small plants grown without a check are most satisfactory. Growers for exhibition commonly plant in beds. I find them do equally well either in lines amongst other plants or planted singly in mixed borders. Whichever plan is chosen, a rich well-cultivated soil is necessary to have them fine. Each plant, if well grown and space allowed, will make a bush three or four feet through towards the end of the season. It is well to remember that allowing them plenty of space for growth secures quite as many flowers as if, say, double the number were grown; whilst those plants having the most room for head-growth produce the finest blooms. If the weather is dry when the plants are put out, one good watering is given, some dry soil being thereafter drawn over the surface as a check to evaporation. Small plants may also have their roots drawn through a mixture of water and soil—mud, in fact. This is found very beneficial in extra hot weather. Except when first planted out, our plants are never watered. Where autumn winds are destructive, it will be necessary to take the precaution of securing the plants by one or more stakes, otherwise no supports are required. The only other points to be attended to are the removal of the flowers when "over," and securing a sufficient number of the best flowers for seed. African Marigolds are further benefited by having the flower-buds thinned out. The flowers cut for seed should be

hung in small bundles in a dry warm room to ripen : this is a somewhat important matter, as good well-ripened seed is not always to be got. These past few years seed has been very poor in germinating quality. In selecting French Marigolds for exhibition, blooms with distinct and even markings should only be cut ; depth of petals ought also to be considered, as well as the width of the flower. Any undeveloped florets in the centre of the flower should be removed, as also those grown out of shape. African Marigolds do not form such symmetrical blooms in cold weather as in warm : warm positions should therefore be given these. Also in preparing blooms for showing, their symmetry is improved by removing florets out of harmony with the rest. The colours of these cannot be too pure—the nearer to a dark orange or a clear lemon the better. From a mere utilitarian point of view I find Marigolds very useful. The French is used, in the case of self flowers, which are, some of them, very rich and dark, others pure yellow, for mixing in vases. The African is much used for church decoration in autumn ; these are also very sweet-scented, a fact not very generally known. I also grow a very good selection of the old double-pot Marigold. Being quite hardy it receives no other culture than a good soil.

R. P. B.



TUBEROUS BEGONIAS.

PERHAPS no class of decorative plants has been so much improved of late years, and the cultivation of them so much increased, as that forming the subject of these remarks. Tuberous Begonias are now become quite indispensable in almost every place of any pretensions ; and they certainly well deserve all the care and attention bestowed upon them. They are so various in their shades, colours, and habits, and generally so free-flowering, and continue flowering for such a length of time, that as a decorative greenhouse plant they are unrivalled. They are easily grown, either from seed or by cuttings. When a good strain of them is grown, it is desirable to save one's own seed by crossing with approved kinds. They generally seed pretty freely. The seed should be sown early in spring, in pots or pans prepared with equal proportions of loam and leaf-mould, with a dash of sand, finishing off with some finely-sifted soil for the seed-bed. Sow the seed and press it gently into the soil with a piece of board, or any thing else suitable : water through a fine rose, and cover with a piece of glass until the seed begins to vegetate, when the glass should be tilted up a little, so as to allow a little air to get in. The pans must be set in a warm house.

When the seedlings are fit to handle, either pot them off singly, or better still, prick out a few into 4- or 6-inch pots. This will not necessitate such frequent waterings. Should they be potted singly in small pots, they might be plunged in cutting-boxes among leaf-mould or sawdust, which will keep them at a more uniform degree of moisture. As it is desirable to have the bulbs as strong as possible, they should not be allowed to stand still, but be kept growing on in heat the first season, and regularly attended to with water—yet not overdone, else they may damp off.

Now as regards wintering them. Many have experienced some difficulty in keeping them over the winter ; and indeed we have more than once known gardeners lose almost their entire stock during the winter months, and we have suffered ourselves in the same way. The usual way was to dry them off entirely, laying the pots on their side in some out-of-the-way place, and keeping them dust-dry all winter. Well, this is a mistake which we were also guilty of at one time, but have now abandoned for what we consider the more rational one, of keeping the bulbs fresh by a moderate supply of water during the time they are at rest, and in a temperature of about 50°, and we now seldom lose any. They will begin to push away at the proper time, or may be hastened by being introduced into a warmer house and more liberally supplied with water. They may be repotted or shifted into larger pots after they have made a few inches of growth, using good fibry loam, a little peat, and enough sand to keep it free and open. They require to be very carefully watered for a time after shifting, especially if they have got a large shift, else they may damp off. A layer of well-rotted dung may be placed over the crocks, which the roots will revel in when they reach it.

When a collection of named varieties is grown, and it is thought desirable to increase them, this may be done by cuttings taken from off the old plants as soon as they have made enough growth for that purpose. In selecting the cuttings care should be taken to choose non-flowering shoots, as those bearing flowers do not readily form bulbs ; and though they thrive well enough during the summer, the chances are that all will go off during winter. Cuttings may be put into any convenient size of pot or pan, draining them carefully, and filling to within an inch and a half of the rim with ordinary potting soil, and then fill up with sharp river or silver sand. Insert the cuttings, water, cover with a bell-glass, and then plunge the pots where a brisk bottom-heat is maintained ; they will root in two or three weeks, when they may be potted off singly and treated as described above for seedlings.

Though Tuberous Begonias do well in a greenhouse after they are fairly established, still in the earlier stages of their growth each season they must have heat until they reach the flowering stage, and even then they do best in a warm greenhouse or intermediate house. They do not like cold draughts, therefore they should not be placed where there is risk of this. In the south of England and in parts of Ireland some of the kinds do fairly well planted out of doors. It is to be feared, however, that we will never get a strain of them sufficiently hardy to stand out in Scotland. Even in England and in Ireland any plants that we have seen had a dwarfish, stunted habit of growth, and were not at all to be compared to the general run of Geraniums for effect in the flower-garden. J. G., W.



HARDY FRUITS.

It is seldom that any pruning or planting of fruit-trees is left till April, but in some quarters such may be the case this season. Late planting will require more than ordinary care, and if the weather is dry, a good watering may be necessary : mulch carefully, and see that the soil is not left loose about the roots. Stakes must be provided for trees which are liable to be blown about by winds ; and when ties are used, let the bark remain intact and free from bruises : old cloth or leather should be placed between the bark and the tying material. Apples and Pears may yet be pruned ; they do not suffer so readily as some other fruits. In grafting one variety of fruit-tree on another of same species, care should always be taken to let at least one side of the bark of stock and scion fit closely : a careful tying to keep the graft in its position is of much importance. We have grafted successfully till end of April, and this season, growth being late, will aid the success of this operation. The sooner (if not already done) all trees are tied in their positions the better : tie so that plenty of room is left for the wood to expand and be safe from cutting by the ties. Blossoms, though late, should be retarded as much as possible. Full power of sun should be warded off : it is the extremes which do the harm. Apricots may have set their fruit thickly, but thinning should be done cautiously and not in a hurry. Much severe weather may yet be experienced. Disbudding of Peaches, Plums, and Apricots may be put in practice ; but sudden exposure is dangerous. The foliage is a natural covering to the fruit, and should be removed with much caution. All outgrowing shoots should be removed first : in a week or ten days the trees may be gone over again. Misplaced shoots should be removed, and where there are vacancies, wood should be left to fill them up. Rank-growing shoots should be either removed to give place to moderate ones, or be stopped to equalise the flow of sap. Let all spurs

forming naturally remain, if there is room for them to develop themselves without crowding. When these are neatly managed and fitting closely to the wall between the main branches, the trees have a nice appearance, and give a minimum of labour compared with the old uncertain system of nailing and unnailing. Figs should now be uncovered and trained in their places: crowding of these is the great evil generally met with; indeed, skilfully managed Figs are the exception and not the rule. The branches on the walls should be clear of each other, as Pears are treated, so that sun and air may act on the wood to ripen it; and when there is plenty of fruit, light and air are very essential to get flavour. Strawberries may be planted on deeply trenched and well-manured land: plenty of room may be allowed them, especially the large-foliaged kinds, such as Keen's Seedling. When Strawberries are forced, they may be taken care of for planting: when well-hardened and planted in rich soil, they make fine fruiting plants by next season. Currants and Gooseberries being planted (an operation we are likely to perform too late, the space not being ready) should be well cut back, made firm, and well mulched.

In the Orchard-house watering must have careful attention: tepid water (at least that which is as warm as the soil in the structure, should be used. Look after insects: dust with tobacco-powder if aphids should attack the trees while in flower, fumigate when the fruit is set, air carefully in cold biting weather, and avoid extremes as much as possible. Be careful not to use the syringe in unheated structures late in the day when weather is cold. M. T.



THE AMATEUR'S GARDEN.

MELONS, CUCUMBERS, VEGETABLE MARROWS, AND TOMATOES.

Melons.—Many amateurs shrink from growing Melons because of fancied difficulties and warnings from friends who have failed. But where manure is plentiful enough to afford such a hotbed as was described when treating of Asparagus, and when there is an idle frame, there is no reason whatever why amateurs should not produce 12 or even 20 lb. or more of fruit from an ordinary frame, if only sufficient care be taken to give the plants the proper conditions, and a free-fruiting hardy variety be grown. Being in possession of a small, hardy, and certain fruiter, we are in the habit of furnishing plants about the middle of May to friends who are invariably successful in growing good crops of well-ripened Melons a little larger than one's closed hand. Its name is "Little Golden Queen," as it is a selected variety of "Golden Queen."

The first thing requiring attention is the raising of the plants. Some may be fortunate enough to get a Melon-growing friend to do this for them, and, failing that, may put up a hotbed for the purpose about the second or third week of April. If put up earlier, a difficulty may be experienced in keeping up a proper temperature; if later, the fruit will not ripen before September; but if done about the middle of April, the variety we name will ripen while the sun

is strong, in the month of August. The temperature required is something like 80° to 90° for bottom-heat : if it gets higher, make holes in the bed, and pour in cold water to reduce the heat. But if prepared as advised, by frequent turnings, and stable-dung and leaves be used in equal proportions, it is not likely to become too hot. After the bed is built, put on the frame, close the sash, and wait till the danger of the heat getting too high is past ; then sow the seeds in good light loam, or in soil as near that description as possible, in $4\frac{1}{2}$ -inch pots filled three-quarters with soil—three seeds in a pot ; and having covered the bed all over with earth, old tan, old manure, cocoa fibre, or sawdust, to the depth of 1 inch and 5 inches where the pots are to be placed, plunge the pots to the rims. Give no water if the soil be as it should be—moderately moist. Keep the air temperature about 70° to 75° , and admit air on every favourable opportunity ; indeed, never close the light altogether. Should the weather prove severe, cover the frame with mats at night, letting the mat drop over the opening at top, to prevent currents of wind entering the frame ; while excessive moisture will readily escape through the mat. Accumulated moisture is often a fatal evil. Although the night temperature sinks to 60° , or even a degree or two below it at night, no harm will happen provided that the day temperature is at least 70° . In a dung-frame little water will be required ; but do not let the plants suffer from drought, and let the water be as warm as the bottom-heat. When the plants have grown above the pot, fill the pot with soil to within a quarter of an inch of the top—the same as that recommended for sowing them in—taking care to have it warm by putting it into the frame the day previous. When the pots are fairly filled with roots, shift them into 6-inch pots, using the same soil. Always use the soil comfortably moist, but not sticky, to obviate the necessity of giving water until the roots make a fresh start. Meanwhile be getting materials ready for a second bed, in which to fruit the plants.

If all goes well, they will be ready for transplanting by the time they are from four to six weeks old. When the plants have made two rough leaves, rub out the centre bud, which will cause the plants to throw out three or four side shoots ; these reduce to two. When the plants are just pushing these, then is the time to plant in the permanent bed. The best soil is a rather tenacious loam from an old pasture, which should be three months in store, and mixed with about a sixth part of horse-droppings if it be heavy, and cow-droppings if light, and a good watering of cow-urine. If good loam cannot be procured, common garden soil will do, and the nearer it approaches maiden loam the better—the worst soil for Melons being black kitchen-garden mould. Avoid rank manure and leaf-mould. Spread 2 inches of the soil all over the bed. Put a little mound in the centre about a foot deep, and 9 inches from the glass. Put two plants in the centre if of Little Golden Queen ; but one will do of such kinds as Little Heath, which is a hardy amateur's Melon. When they start into growth, train a shoot of each in the direction of each of the corners of the frame. Add more soil to the mound as the roots come through it, eventually covering the whole bed ; and when shoots reach within a foot of the corners, nip off their points. By this time lateral shoots will be coming from the axil of every leaf, which will show fruit at the first joint. In "Little Golden Queen," two and even three fruits at a joint is a common occurrence. Train these laterals at right angles to the main stem, and stop them, one joint beyond the fruit, and ever afterwards keep all young growths rubbed off. Thin the shoots rather than allow them to be crowded.

Should the weather prove bright and sunny, plenty of air will require to be

given daily; and the frame should be closed in time to shut up sun-heat. In dull weather the temperature should not be lower than 70° , and with bright sun will be all the better if it run as high as 90° . Just before coming into flower, give a thorough soaking of liquid-manure, made of urine diluted with five times its bulk of pure water, and of the temperature of 80° or 90° ; and, again, after the fruit is set, taking care that the soil is never allowed to become dry. When in flower, impregnate them. The way to do it is to take a male blossom by the stalk in the right hand, and with the left remove the flower proper, leaving the male organ untouched, and giving a gentle brush on the nail of the left-hand thumb, when, if traces of a yellow powder remain, it is in "condition" for giving the stigmas, in the centre of the female flower, a slight brush to cover them with the powder. The best time to impregnate is when the sun is shining about mid-day.

Should red-spider or thrips appear, attack them at the very first with a sponge and soap-water. The red-spider is likely to trouble them in hot seasons, and is so small as to be almost invisible. Syringings overhead will do much to prevent its appearance and to hold it in check; but if taken at once with a sponge and water it will not do much harm. If allowed its own way it will certainly destroy the plants. As the fruit approaches maturity, in cloudy districts or seasons, water should be withheld until the soil is rather dry, which will assist in giving a finer flavour than would be secured were the soil kept wet; but keep the foliage from flagging by excessive drought. In hot seasons, and in the sunny South, water will be required liberally to prevent the leaves flagging; and with strong sun, of course, the fruit is finer.

Cucumbers.—These are much more easily grown than Melons, and any ordinary soil will suit, if it be rich, or made so by the addition of well-decayed manure. Less bottom-heat will do, although a bed the same as has been recommended for Melons is more likely to give satisfaction—more especially in cold or northern districts. In favourable localities in England, great breadths of the hardy "ridge" varieties are grown in the open air in the way we shall recommend for Vegetable Marrows. In such districts the finer varieties are grown with very little bottom-heat indeed during the summer months; but the great majority of growers are compelled to provide bottom-heat if satisfactory results are to be reasonably expected. Except in the matter of soil and training, the whole directions given for Melons will also suit the Cucumber. The training is a little different, and a greater amount of atmospheric humidity is advisable. Instead of training out a certain number of main growths to produce a sufficiency of fruit-bearing laterals simultaneously, as is necessary in the case of the Melon, the aim in Cucumber-growing is to provide for a successional supply from the same plants during the whole season. For this purpose, plant either one or two plants in the middle of each frame, and lead away two or three shoots to the back and front of the frame. One-half of these shoots may be allowed to run on a bit, and the other half stopped at every joint at which fruits are produced. The unstopped shoots that have extended may be treated the same way, and then be quite removed after those early stopped growths have come up on them—always keeping the shoots thin, and not allowing the plants to bear too much at once. Keep the soil steadily moist; and should there be any signs of weak growth, through poverty or overbearing, give soakings of the liquid manure. The same insects that infest the Melon are also troublesome in the case of the Cucumber; but when raised on hotbeds, and not in hothouses among other plants, and when grown vigorously on a hotbed with plenty of moisture, they

are seldom troubled with insects. The best varieties for the amateur are Volunteer, Telegraph, and Munroe's Duke of Edinburgh; but everybody has a certain favourite of his own. The more recently introduced varieties may be better for exhibition, but those named are most prolific.

Vegetable Marrows.—There are not many districts south of the Grampians where crops of these may not be secured, if the young plants are nursed a little after being planted. They may be sown in the same manner as Melons, and placed in the same frame, although the heat will be rather too much for them, and will cause them to be drawn. But as the amateur is not supposed to have a choice of structures for different plants, he is often compelled to make compromises; and as a greenhouse has just the opposite fault of being too cold, they can be raised with the young Melons, and would place them more directly in the way of the ventilation, and near the glass; and with care there is little fear of their being injuriously "drawn." An intermediate temperature is more suitable. In the majority of instances it will be advisable to have a little fermenting material ready by the time the plants are ready to put out. There is no need for much trouble in the preparation of it. A pit should be thrown out, in some warm sheltered corner in the full sun, to the depth of $1\frac{1}{2}$ foot. A pit 6 feet by 4 feet is sufficiently large to grow three plants, supposing there be a good space all round to allow of their extending. Fill the pit with fresh manure, and cover over with some light rich earth. Choose warm weather for planting—from the middle of May to the middle of June. Nurse the plants with hand-lights; and when they outgrow them, peg the shoots regularly over the bed to prevent them being blown about and broken. Such a bed ought to give a good barrow-load of fruit. For a Vegetable, Hibberd's Prolific, or Moore's Vegetable Cream, are the best we have tried.

Tomatoes.—Sow the seeds thinly in 6-inch pots in light soil. Cover lightly, and when of sufficient size, prick out into small pots, and shift into 6-inch ones by the time the small ones are filled with roots. In cold districts they give much better results if grown altogether under glass on the back walls of vineries, greenhouses, or some similar situation where they will get sun and air. In warm favoured districts, blank spaces on walls facing the sun will do very well; but it is only in very favourable places where they do well in the open quarters. We have found that when planted against walls, if the soil be poorish and wholly above the ground-level, and kept in its place with bricks or boards, with broken stones for drainage, they are very materially forwarded. Indeed, the first time we tried the plan, with one-half our plants, those so treated yielded a large amount of fruit by the beginning of August; while those planted in the ordinary way were green at the beginning of October. They require severe pinching. Always pinch off the shoot beyond the bunch; otherwise it will neither set nor swell its fruit well. The shoot which springs from below the bunch can be trained out to furnish another bunch, and so on. In no case, unless in pots under glass, use rich soil. The Conqueror is excellent, but Orangefield dwarf is good, and so is Hathaway's Excelsior.

A GARDENER.



BEDDING - PLANTS.

TENDER bedding-plants, as *Verbenas* and *Ageratums*, do better propagated during the present month than those propagated earlier in the year. Accordingly, as many as possible of these and kindred subjects ought to be struck this month. A properly managed three or four light frame, set on a hotbed of dung and leaves, makes a capital place for propagating purposes at this season. A portion of the surface of the hotbed may be covered with a layer of light material and cuttings dibbled into it as soon as the heat is at a safe point. When the cuttings are sufficiently rooted they are boxed off, a little fresh material added to the surface of the bed, and another batch of cuttings introduced. I always obtain my best plants propagated thus. The greater number of the *Dahlias* required should also be propagated this month, as these can be grown on to strong plants without in any way being drawn or becoming pot-bound. Seeds of quick-growing plants, as the Castor-oil family and variegated *Maize*, should now be sown. Where there is a chance of their not getting proper treatment through overcrowding, the sowing may be deferred still later. Should seed of the "Golden Feather" *Pyrethrum* be not already sown, no time should now be lost in doing so. I merely sow it thinly in boxes, and when large enough prick out the seedlings directly into their summer quarters. *Tagetes signata* *pumila*, ten week Stocks, Asters, Marigolds, and *Phlox Drummondii* do well sown now in cold pits or frames, transplanting the seedlings when large enough from thence into their permanent places. The following hardy annuals, sown this month, will come into flower throughout the summer, and be very showy till late in autumn. A hundred per cent more seeds need not be sown than plants required; and, when large enough to thin, give each plant as much space as other bedding-plants. *Delphinium cardiopetalum*; *Limnanthus Douglasii*; *Linum grandiflorum rubrum*; *Lupinus Cruickshankii*; *Lupinus nanus albus*; *Nemophila insignis*; *Gilia tricolor*; *Koniga maritima*; *Leptosiphon densiflorum albus*; *Specularia speculum*; *Viscaria oculata*. These are all good. All hardy or nearly hardy subjects should be got into their places without delay. Owing to the severe winter, work in most departments will be still in a backward state, but no time should now be lost in getting all kinds of hardy plants divided and replanted. *Violas*, if not already planted out, should be immediately taken in hand. These require most liberal treatment, and a dressing of cow-dung should be dug into the spaces these are to occupy. *Calceolarias* may also be planted now. Of course these will have been growing

in the open for some time back. Where they have been coddled in frames with lights over them, they will require care after being planted out, as a sharp frost under these conditions would tell severely. And just a word as to "hardening off" tender bedding-plants. Where these have been grown in a moist, close atmosphere, it sometimes happens that when turned out to be "hardened off" they are positively withered up with the change, and the summer is far spent before the plants get over the effects of this treatment. It were much better to mat up hardening frames for several days, and, if possible, uncover in showery weather, than to have their life juices abstracted under the too sudden change. Plants grown under an airy *régime* do not suffer from such changes with ordinary care; but very many bedding-plants are not grown under such a condition. Old stock of Phloxes and Delphiniums, which will be now producing a too numerous array of shoots, should have the most of these taken off, leaving from three to six of the strongest to flower. Tritomas should be divided at this season; moderate-sized clumps make far better decorative subjects than those which have occupied the same positions for a great number of years. Alterations in the shape of beds, or other work requiring removal of turf, should be finished without delay. Such work may still be done with safety, provided a small breadth of turf is lifted at one time and relaid without delay. Edgings of walks should be trimmed as soon as the grass has been mown the first time for the season. The walks should be diligently hoed at this time, as by so doing much hoeing will be prevented during the summer season.

R. P. BROTHERSTON.



YOUNG FRUIT-TREES.

I WAS much pleased with some remarks that have appeared of late in 'The Gardener' on our supply and selection of fruit. For who would not like to see fruitful trees and a well filled fruit-room? Some years ago we got a lot of select free-bearing varieties from the nursery. They were clean and healthy; their roots were rather strong and naked. They were nursed for a few years in one of the quarters in the garden before planting out, because we considered it was the cheapest way of assisting the roots, our wish being to have a good supply of roots up to the surface before planting permanently. There were two lines of them, 4 feet apart, alongside the alley. The quarter was newly trenched, and the part they were to occupy was reduced a little, and a strong stake put in for each tree; 3 inches of

charred turf were spread over the surface, and a tree placed to each stake. The roots being spread equally out, 7 inches more of charred turf were put on, keeping up as many of the small roots as we could. The trees were made fast to the stakes, a good mulching of cow-manure was given, and the roots were kept from getting dry until the trees began to make their wood. They were then well supplied with water, and had manure-water several times when the weather was wet during June and July. In October the mulching was removed, and we found the roots coming up beautifully. They then got a top-dressing of charred turf for the winter, and in March they were again mulched with cow-manure for the summer and treated as before. By autumn they were matted to the surface of the turf, and the very mulching could not all be got away. The wood they had made was short-jointed, well-ripened, and well set with fruit-buds.

We were so pleased with the result that all the young trees ever since, whether they may be for walls or orchard, are all mulched for the summer, and top-dressed in autumn.

We have heard much about lifting and root-pruning: some are successful, while others are not. But such trees as are referred to above, with their roots matted to the surface, may be lifted and examined at any time with perfect safety. We consider the simple work of mulching in the spring and top-dressing in autumn to be of the greatest value for all kinds of fruit-trees.

J. M'INTOSH.

CARDROSS.



ORNAMENTAL TREES AND SHRUBS.

VINCA (THE PERIWINKLE).

OF the shrubby species belonging to this interesting genus, only two are hardy enough for open-air cultivation in this country. These are evergreens with a trailing habit of growth, indigenous to a somewhat wide area on the Continent, and probably also to Britain, where, if not really native, they are found in some districts in considerable abundance, growing, as one writer remarks, "in hedges and banks, in woods, but too often near pleasure-grounds." They were formerly known under the popular name *pervinca* or *pervinke*, and one or other of the species is alluded to by the old English poet Chaucer so early as the fourteenth century:—

" There sprang the Violet all new,
And fresh pervinke rich of hew.
And flowers yellow, white, and rede,
Such plenty grew there never in mede."

It is scarcely necessary to say that both species, with their varieties, are perfectly hardy, and that they grow freely in almost every variety of soil. Few of the low-growing evergreens are more valuable for covering bare ground under the shade or drip of trees; while, if not quite so luxuriant, they succeed very well on rough banks or rockeries with sunny exposures, which they soon clothe and render attractive with their abundant bright foliage and beautiful flowers. They are sometimes used for vases and hanging-baskets both in the open air and in the conservatory—a purpose for which, from their long, graceful stems, all the sorts are peculiarly adapted.

V. minor (*the Lesser Periwinkle*).—The long wiry stems of this species trail along the ground, and when in contact with soil strike root at almost every joint. The leaves are oblong lanceolate, and of a dark shiny-green tint. The flowers are light blue, usually produced in succession from March till September, though in mild seasons, when growing in sunny aspects, they are sometimes seen in midwinter.

Var. alba.—This variety differs only from the species in having pure-white flowers.

Var. flori-pleno.—Flowers double, bright blue; an exceedingly pretty and free-flowering variety.

Var. argentea.—The leaves of this plant are freely variegated with pure white.

Var. aurea.—with leaves variegated with bright gold. Both this and the preceding are very ornamental, and might be utilised with advantage in carpet-bedding and margins of flower borders.

V. major (*the Greater Periwinkle*).—This species is much larger in all its parts than the other. The stems being thicker, are sub-erect, rising sometimes 2 feet, after which the tops droop to the ground, giving the plant when standing alone the appearance of a dwarf, bushy-headed shrub. The leaves, which are fully twice the size of “*minor*,” are ovate-cordate, minutely ciliated, and bright glossy green. The flowers vary in shades of blue and purple; they come out in succession from March till September, though they sometimes appear in midwinter.

Var. elegantissima.—A variety with fine golden variegated leaves. A superb plant, well worthy of a prominent place in any flower-garden or shrubby border.

Var. aurea reticulata.—Another beautiful plant, with its leaves prominently netted with bright gold.

Var. argentea.—Leaves variegated with white.

HUGH FRASER.

PEACHES DROPPING PREMATURELY.

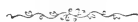
GARDENERS as a rule are very greedy—at least they get this name—and for my part I think I am no exception, although, in common with the most of my brother-gardeners, my greed puts nothing extra into my pocket. It often adds to my discomfiture. When large crops are taken successively, the trees in time are bound to succumb; and the employer is more than likely to forget all about the successes of the past, and think very little of them on account of the subsequent disappointment. The cause of Peaches dropping prematurely is, I believe, common to most fruits. The well-covered Pear-tree has its first, second, and third qualities of fruits on it: because it is not able to support all sufficiently, some take the lead and keep it. Apples are the same. I have seen trees with two or three dozens on them, all splendid plump fruit; while, on the other hand, I have seen them in other years having an abundant crop, with more than the half being inferior—the best not at all good specimens. In fact, there is just a certain work a fruit-tree can do, to do it right; but if we force it beyond that work, it must end in failure and disappointment. In the case of hardy fruits, we can do without large crops every season—indeed, we do not feel it much if they should miss altogether; but not so with fruits under glass. The Peach, like the Vine, has great bearing capacities, and if well treated will repay all trouble; but “well treated” means much.

I have a small Peach-house which I have forced every year, the trees in which have not failed to produce a good crop for eight years in succession. The fruits that remained on to maturity were always excellent in quality and size. I fancy I cropped a little beyond the capabilities of the trees, and consequently some dropped off prematurely. Some of your readers will smile and say, “Thin more in future, and less will drop prematurely.” This is all true, I doubt not. But I like a numerous crop, and so does my employer.

I was very much interested lately by reading in ‘The Gardener’ an account of an experiment with Melons—growing them almost without soil, by giving them the ingredients which form their constituent parts. I have been thinking since, if the same rule could be adopted with Peaches, it would no doubt prove very satisfactory. It is evident that any fruit-tree year after year growing in the same soil will in course of time deprive the soil wholly of whatever constituent the tree most requires. The Peach, for instance, would require an inorganic soil, on account of the many large stones it has to make. There is much written about suitable soil for different kinds of fruit-trees and plants. The secret must be, and is, that certain soils contain the elements required by certain trees and plants. So if these elements could be supplied in a consolidated form to fruit-trees, according to their wants, the result no doubt would be most satisfactory. Each season I feed my Peaches well with tank liquid-manure and guano,

and no doubt this accounts for my success in having good crops each season. But as I said at first, many of the fruits I leave for a crop drop prematurely. They are to all appearance ripe and good, being soft but sour, and about a third less than those that ripen ten or twelve days later. It is to meet this that I would suggest that food in a consolidated form might be supplied; for it is clear, when the trees can carry all the fruits through all their stages, and maintain their health and vigour, that if they got the proper assistance at the ripening point, the result would be a great success. I hope to hear from some of your scientific readers what chemical preparation I can procure to produce, not an extra large crop, but a fair one, all in perfection.

PADDY IN ULSTER.



HEATING BY HOT WATER.

IN 'The Gardener' of last month we have an interesting paper from Mr Hammond on heating by hot water. All who have to do with deep, and in too many cases imperfectly drained, stokeholes will agree with the writer as to the desirability of doing away with those evils. A small boiler may easily be fitted up to heat a single house without taking out a deep stokehole; but when pipes have to be extended to various houses there are very few instances indeed where the heating could be accomplished without some obstacle in the shape of footpaths, &c., coming in the way. After referring to the almost universal custom of giving flow-pipes a continuous ascent from the boiler to their extremity, and the practice of setting boilers below the level of the return-pipe, Mr Hammond says: "Notwithstanding, we do not hesitate to say that the circulation of the water in the pipes will be as rapid with the bottom of the boiler one foot below the level of the return-pipes as it would be supposing the boiler was sunk several feet deeper." With all due respect for Mr Hammond's opinion, I am not quite prepared to accept this statement. Some time ago I had to see to the fitting of a boiler for the heating of a house at some considerable distance off; and from the nature of the ground, and to avoid excavating deeper than was absolutely required, the boiler was fixed at a level which made it necessary to give the flow-pipe rather less than the usual *rise*. Otherwise there was nothing different in the fitting from what is the usual mode. The circulation in this boiler, when set to work, was very unsatisfactory, and when hard fired kept blowing out at the air-pipes at their highest point. To keep the boiler from wasting its energy in this direction I cut the air-pipe and stopped it with a small cork, and when this was done there was a marked improvement in the circula-

tion. My opinion at the time was, that the water in the return-pipes did not move back to the boiler as fast as the heating power of the boiler required; and the consequence was that the water in the boiler boils, or becomes so disturbed as to cause the water to fly out at the air-pipe. Some will be ready to say that this blowing at the air-pipes takes place just the same in many instances where the pipes are high above the boiler. This I admit, but think it is waste of coals to have this go on, and further, that when a boiler is fed by a ball-cock in the supply-cistern, or carefully attended to, air-cocks are far better than the usual air-pipes.

Mr Hammond and most gardeners know that when two or more houses on different levels have to be heated from the same boiler, the most heat always goes to the highest house, if there is no check put on the circulation by means of valves. If two houses are fitted with the same quantity of pipes, but the one higher than the other, and if the one that is highest maintains the highest temperature, is it not fair evidence of a quicker circulation of water in those pipes than in those on the lower level? The chief reason of this, I consider, is because of the additional weight of water coming from the return-pipe in the higher house over that coming from the lower house, and, in consequence, *its power to draw the hot water from the boiler in its wake*. The heating of the water and its consequent expansion and lightness are the first motive power; but I am disposed to attribute the force of circulation more to the weight of cold water returning to the boiler, and acting on the warm water in the boiler as a syphon would do on a cistern of water. If you wish to empty a cistern of water by means of a syphon, the length of time required to do so will be much shortened by having the end of your syphon a *good way below* the level of the cistern. And so, I think, it is with the circulation in our boilers,—the greater the difference between the highest point of the pipe and the bottom of your boiler, the quicker will the circulation be. The water in a boiler at work being much lighter than that in the return-pipes, and assisted by the agitation and expansion conveyed to it by the heat of the fire, *circulation will take place* if the return-pipe is simply fixed immediately below the flow; but it would be slow. Mr Hammond, I think, makes too much of the inclination of the water to form a *return-current* in the flow-pipes, and too little of the fact that the water in the return-pipes is very much heavier—that this heavy column of water is *pulling*, as it were, a lighter one, and at the same time is *pushing* it from below. Whether the rise in the pipes is made by a slow gradient or by a vertical rise, I think, will not make material difference to the circulation; but every foot that they are thus elevated above the

boiler gives, in my humble opinion, greater force to the circulation of the water.

I, like Mr Hammond, would not discuss the merits of the various boilers, each of which is supposed to be *the* best by its supporters. I have had experience of a few; and I must say that when properly fixed, kept regularly cleaned, and otherwise judiciously managed, all have worked well.

I however venture to say, that a boiler that is fitted inside for the regular flow of the water in divisions from the lower to the higher parts, so that the water has to traverse the whole of the boiler before getting out by the flow, will have an advantage over those that are not thus divided.

R. INGLIS.



IN your last month's impression I noticed an article on the above subject, condemning the present system of fitting up hot-water apparatuses for heating plant-houses, which contains various statements the accuracy of which I question. Your correspondent, after alluding to the difference of opinion regarding the best pattern of boiler for economising fuel, goes on to say "that the circulation of the water in pipes will be as rapid with the bottom of the boiler one foot below the level of the return, as it would be were it several feet deeper: and instead of a continuous ascent of the flow-pipes being necessary it retards circulation." He then gives his reason why water circulates under any condition, and asserts as the basis of his theory that the particles of water are incapable of transmitting heat to each other. I would ask your correspondent, if the particles of water are unable to transmit heat, how does hot water impart its heat to cold water when, if there is an equal weight of each put into a vessel, the temperature will become the mean between the two? Perhaps your correspondent may answer that it is caused by the hot getting so minutely mixed with the cold particles that it equalises the whole, which is true to a certain extent. But if hot water is incapable of conducting heat, how does it come to pass that hot water poured upon ice imparts its heat to it, the ice being then a solid? It cannot be caused by circulation or the mixing of the particles with that of the ice, and the ice has come in contact with no heated body but the heated particles of water. But the fact is, water transmits heat to water in the same degree as it does to any other substance or body. Again, he says that if particles of water were capable of transmitting heat in the same way as that of solids, it would be impossible through

the application of heat to cause circulation in the pipes. I venture to say that it would make no difference whatever; the expansive properties of the water would remain the same. All bodies expand by heat, and if it were possible to apply sufficient heat to liquefy bodies, circulation would take place in the same manner. It is by motion in the ultimate particles of matter in either case, whether solids or liquids, by which heat is transmitted. Heat creates motion, and motion creates heat. The difference is, that in solids heat is transmitted by conduction only, but in liquids by both convection and conduction.

Then your correspondent endeavours to show why the rise in the flow hinders circulation. He says the reason for this is plain: as soon as the fire acts upon the boiler, the water in contact with its inner surface bounds upward till it comes in contact with the inner surface of the upper side of the pipe, where it parts with a portion of its heat, and would now return, were it not still lighter than the body of water at the bottom of the pipe which it has just passed unaffected; therefore it has to continue its course on the top of the cold water until it is reduced to the same temperature, when it returns from whence it came by an opposite cold current at the bottom of the pipe to the boiler, and descends through the hot water and takes its seat at the bottom to be heated over again. He therefore asserts that we have two currents of different degrees of temperature moving in opposite directions in the same pipe. If your correspondent's theory is correct, we would have no use for a return-pipe at all—a flow would be sufficient. But such is not the case: the water in the boiler on being heated expands, consequently it then becomes lighter than the water in the pipes, hence its tendency to rise. And as the water from the flow which proceeds from the top of the boiler cannot descend without mixing and equalising the temperature of both, therefore the water from the return which is situated at the bottom of the boiler rushes in and gets heated likewise, and continues to expand and ascend the flow-pipe, equalising and forcing the cold water before it. And that part of the structure which is situated farthest from the boiler will be the hottest, the pipes being at the highest elevation; which goes far to prove that a continuous rise in the pipes does not hinder circulation, but the reverse.

C. M.

[It is quite evident that this is a subject that requires to be discussed.
—Ed.]

RAISING VINES FROM EYES ON TURVES.

I SHOULD not have alluded to this subject had your correspondent, Mr Hinds, not mentioned names in describing the system of raising Vines from eyes on turves, which he has adopted and found so successful. I have just to say, that the plan recommended by Mr Hinds is that which was first practised and recommended by me; and his instructions in the matter of details are essentially the same as those furnished by me in 'The Garden' some years ago, where Mr Hinds no doubt gained his information partly, for he has had other and exceptional opportunities of becoming acquainted with my sod-system of striking Vine eyes. It is difficult indeed to believe that Mr Hinds was not conscious that it was my plan he described when he wrote, more especially as Mr Thomson's system and mine have been frequently commented upon in nearly all the horticultural papers.

No one would imagine, in fact, from Mr Hinds' statements in 'The Gardener,' that he had the least acquaintance with Mr Thomson's system, which, as Mr Thomson himself stated in 'The Gardeners' Chronicle' years ago, has "nothing in common" with mine, except that we both used turf—the ultimate object of the two systems being quite different, and the mode of raising the eyes also. The plan recommended by Mr Hinds is one adopted here with nearly every Vine we have raised since 1864. Mr Thomson's system he will find in the back volumes of 'The Gardener' and 'Journal of Horticulture.'

J. SIMPSON.

WORTLEY.



TESTING THERMOMETERS.

THE London gardening weeklies, during the late severe winter, seldom issued a copy without containing some warning, complaint, or instruction in regard to Thermometers. The low readings recorded in some of the ordinarily favoured counties were received with reservation, and the untrustworthiness of instruments was accredited with the extreme temperature indicated. Thermometers may be corrected as follows:—

The common and misleading idea that "freezing-point," as marked on the scale of the Thermometer, is the point at which water freezes is an error. Under different circumstances, which it is not our present purpose to explain, water freezes at different temperatures below what Thermometer-makers understand as "freezing-point," of course, or exactly at it. But while the air may sink below freezing-point before water freezes, the person who watches the first indication of ice to know whether his Thermometer be correct or not, may be led into error; and the air in contact with grass may be freezing, while 3 feet from the ground it may be a good many degrees higher. Evidently, then, the freezing-point cannot be found this way, although many persons are astonished at the supposed vagaries of Thermometers. But ice melts invariably

exactly at one point, and no variation occurs in the phenomenon, and the "freezing-point" of the Thermometer-makers is just the point at which ice melts. We corrected four Thermometers lately in this way. We took a pail with a hole in the bottom, which allowed melting water to escape, and drained it like a pot (a large pot would do) with lumps of ice, which was exposed to the air of a warm house a few minutes to start it a-thawing. Over these we put more ice, pounded small, and buried the Thermometers in the centre—leaving the pail and its contents where the temperature was over 60° for a couple of hours, and then *united* the Thermometers. Before this they were placed side by side, and all indicating somewhat different temperatures. There was only one "cheap" one amongst the lot—the rest were marked "warranted." On picking them out, No. 1 proved two degrees too low; No. 2 proved three degrees too high; No. 3 was ten degrees too high; and the "cheap" unwarranted was correct—at freezing-point. Whether they be correct at any other point could only be tested alongside of one with a scale reaching to boiling-point (at the level of the sea—elevation makes a difference), and by this means proved correct; but, unfortunately, we did not at that time possess one with so extended a scale.

One point more demands attention. Sometimes a portion of the spirit—in spirit instruments—gets detached, and some difficulty is experienced in getting the portion to reunite. Some people recommend waving the instrument smartly at arm's length to secure this. An easier, a better, and a much more scientific way, is simply to plunge it into water of the same temperature as there are degrees in the scale of the instrument. This causes the spirit to fill the tube, when a sudden plunge into cold water will prevent its swelling more, and then it will be found that the column of spirit will recede in a body. A. H.



RAPID GROWTH OF YOUNG FOREST-TREES.

THERE is a young wood which forms the north boundary of the flower-garden here planted about eight years ago with various varieties of trees, the growth of some of which have been so rapid, that it may be worth recording, for the benefit of your readers. The place is open to the north, but sheltered in every other direction, and the soil is a yellow loam resting on a sandstone bottom. A *Wellingtonia gigantea* has attained a height of 20 ft. 9 in.; another, 20 ft. 3 in.; and a third, 19 ft. 9 in. Several *Larch*-trees have reached a height of 26 ft.; a *Balsam Poplar*, 25 ft.; a *Lombardy Poplar*, 34 ft. 6 in.; *Spruce*, 26 ft.; *Scotch Fir*, 18 ft. 6 in.; a *Cupressus macrocarpa*, 25 ft.; *Cedrus deodara*, 15 ft.; a *Cryptomeria japonica*, 16 ft., and another, 13 ft. 6 in.,—and various others of sizes nearly approaching to the above. The plants were all about from 2 to nearly 3 feet high when planted.

While on this subject, I may mention an old *Yew*-tree which is here, and under which tradition says that the barons met in conclave to concoct the plot which ended in the blowing up of the Kirk-of-Field and the murder of Darnley, the unfortunate consort of Mary, Queen of Scots. The outside circumference of branches is close on

100 yards. The branches radiate from the main trunk at about a height of 10 ft., and sweep down till they rest on the ground all round, leaving a clear open space underneath of 32 ft. diameter; circumference of trunk at 3 ft. from the ground is 10 ft. 7 in.; and the height of the tree is about 42 ft. It is not quite in such vigorous health as it was about twelve years ago. There is a tree of the *Eucalyptus viminalis* here also, which was about 30 ft. high in 1860, when it was almost killed with severe frost. It was cut over at 9 ft. from the ground, and sprung away again. It is now over 50 ft. high; main trunk is 8 ft. 6 in. in circumference; one of the branches is 4 ft. 6 in.; another 3 ft.; and a third, 2 ft. 10 in., besides several of lesser dimensions.

There is also a plant of the *Garrya elliptica*, which measures 21 yards in circumference and 10 ft. high. It stands in quite an exposed position, as a specimen on grass, and a very fine symmetrical plant it is.

JOHN GARRETT.

WHITTINGHAME.



THINNING ONIONS UNNECESSARY.

SOME time ago I stated in 'The Gardener' that Mr Pettigrew of Cardiff Castle Gardens never thinned his Onions. On his recommendation the Onion crop here, in 1878, was treated in this way, with the most satisfactory results. At the end of the season the crop was a very heavy one for the size of the ground it occupied; and although many of the bulbs were growing in clusters of fives and sixes, all were of fair and useful size. In fact, many were above the average in this respect, as we were awarded second prize at Cardiff amongst over a score of competitors, and the bulbs were all selected from one unthinned row. For little labour and a heavy crop this plan may be highly recommended.

J. MUIR.

MARGAM.

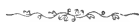


GREENFLY ON THE GOOSEBERRY.

I VENTURE, through the pages of 'The Gardener,' to ask its numerous readers if any of them have experienced any difficulty in keeping down this pernicious pest? For the last few years I have been very much troubled by them attacking the bushes just before the fruit begins to ripen. I may mention that the soil, a gravelly hard pan, has been regularly forked over and manure added ever season. Acting on the idea that the roots might have got away down into the cold bottom, where they were beyond the reach of the ordinary modes of culture, in the autumn of 1876 I set to work and had them all

lifted, trenched the soil to the depth of two spadings deep, and forked in a quantity of stable-manure, planted the bushes, taking care to spread the roots very evenly over the surface, then covering up with good fresh soil; that season they matured a good crop and made fair wood. But again, in 1878, they were attacked by the fly; again I managed to save the crop by taking a pair of hand-pruners and cutting off the points of the wood affected; but this is a process which for several reasons I would not like to repeat. I shall therefore feel obliged to any of your readers who may have been troubled by the same pest giving their remedies in 'The Gardener.'

RIFLEMAN.



ROYAL HORTICULTURAL SOCIETY.

ACCORDING to the arrangements of the Society medals were offered for Cyclamens exhibited at this meeting, and in response the finest display of these charming spring flowers that has ever been brought together was arranged in the conservatory. These constituted a show in themselves, and the splendid varieties showed on the one hand the marvellous improvement that has been effected in this popular flower, and on the other afforded striking evidence of high cultivation. The meeting was thus, by the Cyclamen groups alone, both attractive and instructive. Prominent as another great attraction of the meeting was a magnificent group of Orchids exhibited by Sir Trevor Lawrence, Bart. The vigour of the plants in this group, and the size and freshness of the flowers, riveted the attention of all beholders. These groups, with collections of plants from most of the leading nurseries, and a good display of fruit for the season, rendered the meeting a highly successful one.

FRUIT COMMITTEE.—John Lee, Esq., in the chair. Messrs Kinmont & Kidd, nurserymen, Canterbury, sent a seedling Apple called Duchess of Edinburgh, raised from crossing Golden Winter Pearmain with Court of Wick. It was a good Apple, but not so good as many varieties at this season. They also sent Uncle Tom, another seedling which had no merit. Mr M'Robie, Broomsberrow Place, Ledbury, sent a seedling Apple which possessed no merit. Messrs. W. Paul & Son, Waltham Cross, sent fruit of Peck's Pleasant, an American Apple of tender flesh and sweet flavour, but it had no great merit, being rather mawkish. Mr Divers, gardener, Wierton Place, Maidstone, sent three dishes of Apples, consisting of Golden Knob, Green Nonpareil, and Pomme Royale, Ribston Pippin, Hanwell Souring, Blenheim Pippin, and Northern Greening; a letter of thanks was awarded. Mr Wallis, gardener, Keele Hall, sent a dish of Beurré Diel Pear, which was passed. Messrs Sutton & Sons, Reading, sent a seedling Rhubarb, named the "Reading Ruby," which was not considered an acquisition. Mr Lewis Killick, Langley, Maidstone, sent twenty-four varieties of Potatoes. Mr S. Ford, The Gardens, Leonardslee, Horsham, sent a collection of forty-nine varieties of Apples and one of Pears; these had been remarkably well kept, and the Committee awarded a letter of thanks.

FLORAL COMMITTEE.—G. F. Wilson, Esq., F.R.S., in the chair.

Cyclamens.—As before observed, one of the most striking features of the meeting was the extensive display of Cyclamens. Mr H. B. Smith, Ealing Dean Nursery, Ealing, contributed quite 300 plants. Part of the group

consisted of pure white, crimson, and red-throated varieties intermixed. The other part of the group was composed of about 120 plants of a pure white variety, all the plants being as dwarf and even as if they had been cast in one mould. They were admirably grown and compact, with good foliage and splendid flowers. Such a collection is rarely seen. It was greatly admired, and a large gold Banksian medal was deservedly awarded to the exhibitor. First-class certificates were awarded to Mr Smith for *Cyclamen Picturata*, a splendid variety, having petals $2\frac{1}{2}$ inches in length and nearly an inch in diameter. The colour is satiny white suffused with rose, the base of the petals and throat purplish crimson; leaves small, marbled, and serrated; flower stems stout, and a foot in height; plant floriferous and very attractive. Also for *Crimson King*: flowers medium-sized, colour glowing magenta crimson; flower stems mottled, and a foot high; foliage large, round, and smooth; a variety of great promise.

Messrs Edmonds & Son, Hayes Nursery, Hayes, Middlesex, also staged a very pleasing group of *Cyclamens*; some of them were very large plants, on one of which were 220 fully expanded flowers, the corm being fully 7 inches in diameter; the whole of the plants were well flowered, and some of the colours were very rich. A silver-gilt Banksian medal was awarded. Mr R. Clarke, Twickenham, also exhibited 100 plants of a very highly coloured crimson variety, and about the same number of mixed varieties. The plants were somewhat smaller than those in the preceding collections, but the colours were very bright and striking. A silver Banksian medal was awarded.

We now notice a group of Orchids of extraordinary merit contributed by Sir Trevor Lawrence, Bart., M.P., Burford Lodge, Dorking (grower Mr Spyers). About thirty-six plants were staged. It were impossible to speak too highly of the splendidly cultivated and densely bloomed plants; the richness of colouring of some, and the chaste purity of others, were most striking. Three large plants of *Dendrobium Wardianum*, the centre plant in a pot, the other two growing on blocks, were all alike healthy and grandly flowered. Each plant had about ten vigorous growths, many of them having eight tiers of blooms, or more than 100 large and fresh flowers on each plant. A large plant of *Dendrobium nobile cœrulescens* was profusely bloomed and very beautiful; *Cypripediums* *Boxalli* and *villosum* were large and grand. A magnificent plant of *Celoglyne Lemoineana*, pure white and lemon throat, was very chaste; *Odonoglossums* *crispum* and *crispum* roseum were very beautiful, as was also a well-coloured plant of *Phalænopsis Schilleriana*. *Dendrobiums* *crassinode Barberiana*, *D. crassinode grandiflorum*, and *D. luteolum*, the latter with several pale lemon flowers, were all of them very attractive. *Odontoglossums* *Rossii*, *Lindleyanum*, *speciosum*, *Cervantesii* roseum, *triumphans*, &c., various *Celoglynes*, *Lycaste Skinneri*, the very curious *Spathoglottis Lobbii*, and *Masdevallia polysticta*, were all well represented; and exceedingly striking was a fine plant of *Cymbidium eburneum* with eight grand wax-like flowers; also *Lælia anceps alba* with two flowers, and the brilliant *Lælia harpophylla*, the finest plant we have ever seen, and perhaps the brightest Orchid in cultivation. The flowers—there were twenty-one of them—are in form not unlike those of *Tritonia aurea*, but larger, and are of the most intense orange scarlet imaginable. A large gold Banksian medal was awarded for this fine collection.

A silver Flora medal was awarded to Mr H. Benham, gardener to the Earl of Stradbroke, Henham Hall, Wangford, Suffolk, for four profusely bloomed plants of *Phalænopsis Schilleriana* with magnificent foliage; and a first-class certificate was awarded to Messrs Hugh Low & Son, Clapton, for a remarkable Orchid *Cymbidium Lowianum*. In growth the plant resembles *C. Hookerii*. The spike,

which was gracefully arched, contained twelve flowers, each 4 inches in diameter. The sepals and petals are pale olive green faintly striped with cinnamon, the throat creamy white, and lip a rich velvety reddish brown. It is novel and very striking. A similar award was made to F. A. Phillbrick, Esq., Q.C., Avenue Road, Regent's Park (Mr Heims, gardener), for *Ipsea speciosa*, an Orchid first introduced from Ceylon in 1840. The plant had two bright yellow Dendrobium-like flowers, borne on the summit of a stem 2 feet high, very clear in colour and distinct. The same exhibitor was awarded a vote of thanks for a fine spike and variety of *Odontoglossum Andersonianum*. Mr Green, gardener to Sir George Macleay, Bart., was awarded a vote of thanks for *Odontoglossum crispum* Macleayi, with crimson blotches. Mr Green had also a similar award for some other rare plants; he also exhibited a bloom of *Vanda Cathcartii*, which had been open for six weeks and had been cut from the plants three weeks. A plant of *Maxillaria* (*Bifrenaria*) *Buchaniana* was exhibited by H. J. Buchan, Esq., Wilton House, Southampton. The throat of the flower is golden yellow striped with brown, petals white, and sepals rose—highly perfumed. The same exhibitor staged cut spikes of Orchids, and was awarded a vote of thanks.

A very attractive collection was staged by Messrs James Veitch & Sons, consisting of fine fringed red and white Primulas, a very superior strain of Cyclamens exceedingly well flowered, a row of dwarf plants of *Aucuba japonica* profusely berried, several very handsome and striking Amaryllises. To one of these, *Virgil*, a first-class certificate was awarded. The flower is very large and of excellent form. It measured upwards of 7 inches in diameter, the well-rounded petals being 3 inches across. The prevailing colour is cream with a greenish tinge, the centre of the petals being flaked and spotted with scarlet. It is of the *Leopoldii* type, and an extremely fine variety. A similar award was made to the same firm for a new and very graceful Fern, *Davallia Mariesii*, an evergreen species from Japan, and both on account of its hardiness and elegance will prove very valuable. Several Palms were included in the group, also a plant of *Camellia reticulata flore-pleno* with very elegant flowers, resembling both in the bud and in a half-expanded state Roses in the same stages; also a beautiful plant of *Lælia Veitchii* with eight richly coloured flowers. Messrs Veitch further exhibited small plants of a new and highly distinct *Dracæna* from the South Sea Islands. This plant, which is named *Princess Marguerite*, is even more elegant in habit than *D. Cooperii*, and is coloured almost exactly similar to *Aspidistra lurida variegata*, two-thirds of the leaves being creamy white, tinted with pink and flaked with green. On account of the evident free growth of the plant and of its clear colours, it can scarcely fail to prove valuable for decorative and market purposes. A vote of thanks was awarded for the collection.

From Mr W. Bull came several attractive Palms, *Encephalartos villosus* and *cycadifolius*; smaller groups of *Odontoglossums* *Phalænopsis* and *cirrhosum* intermixed with small Palms, *Cattleyas*, *Lycastes*, *Oncidiums*, &c.; also several plants of the much-admired *Dracæna Goldieana*. A very large plant of *Odontoglossum cirrhosum*, with ten spikes; *Vanda suavis*, with a terminal raceme of flowers; *Dendrobium Wardianum*, with enormous flowers; and the distinct and chaste double *Epacris onosmæflora flore-pleno nivalis*. A silver-gilt Banksian medal was awarded for the collection.

Mr B. S. Williams sent an attractive collection of Amaryllises, well-bloomed plants of *Dendrobium Wardianum*, a large centre plant of *Cypripedium villosum*, *Odontoglossum Alexandræ*, a pan of *Dracæna Bausei*, a pair of the pretty and neat-flowering *Primula denticulata*, the new *Azalea Princess Maude*, very bright; some very dwarf plants of *Aucuba himalaica nana*, very profusely berried; and a

very superior strain of *Primula sinensis fimbriata alba* and *rubra* intermixed. A silver Banksian medal was recommended. From Messrs Osborn & Son came an excellent group of decorative plants, consisting of Palms gracefully weeping over well-bloomed Rhododendrons; Azaleas, *Dendrobium nobile*, *Spiræas*, and several small plants of *Cocos Weddelliana* completed the group, for which a silver Banksian medal was awarded.

Messrs W. Paul & Son contributed sixteen boxes of Camellias, which were very much admired. They contained about fifty splendid varieties. Some of the boxes were composed of one variety, amongst which we noted *Fimbriata*, two boxes of *Alba plena*, *Belle Jeanette*, *Imbricata*, *Eximea*, *Marchioness of Exeter*, and the crimson *Bealli*, very bright indeed. *Souvenir Emile Dufresne* is a very striking red flower of good substance, with a white stripe down the centre of the petals. Very effective were some fine flowers of *Mathotiana* and *Madame de Strekaloff*. *Princess Charlotte*, *Elegans*, *La Reine*, and *Montironi* were among the best white varieties not named above. Mr Paul also exhibited a plant of the splendid white *Camellia Ninfa Egeria*, which is not more remarkable for the great excellence of its flowers than for its compact growth and dark glossy foliage. A silver Flora medal was awarded. Mr Cannell, Swanley, Kent, sent two boxes of *Pelargoniums*, very bright and fine; some very dwarf *Ageratums*, Cannell's Dwarf, worthy of its name, and will be valuable for small beds and edgings; and sprays of *Fuchsia cordifolia splendens*, laden with bright *Corræa*-like flowers. A vote of thanks was awarded. A similar award was granted to Mr Blond, gardener to Mrs Graham Smith, Cranbourne Court, for a basket of well-cultivated Neapolitan Violets. A cultural commendation was awarded to Mr Tidy, gardener, Stanmore, for a large plant of *Primula sinensis*; and a vote of thanks to Mr James Redlees, Isleworth, for fine and highly-coloured flowers of *Cinerarias*. Several *Primulas* and *Imantophyllum miniatum* were sent from the Society's garden at Chiswick; and Messrs Prentice Brothers, Stowmarket, exhibited samples of their new fertiliser "*Florivita*"—Life of Flowers—a pale pink powder and perfumed.—*Journal of Horticulture*.



SCOTTISH HORTICULTURAL ASSOCIATION.

THE second annual meeting was held in the hall, 5 St Andrew Square, Edinburgh, on the evening of Tuesday the 4th ult., Mr M. Dunn, president, in the chair. After the disposal of a variety of routine business, Mr Milne, assistant secretary, read the report of the council for the past year, from which it appeared that 111 new members had joined since last annual meeting, and that the roll now numbers 352. Twenty-four papers in all had been read on subjects connected with horticulture, all of which had been followed by interesting and instructive discussions. A great variety of Plants, Flowers, Fruits, and Vegetables had been exhibited, many of them of more than average merit; and, on the recommendation of the adjudicating committees, twelve certificates had been granted by the Royal Caledonian Horticultural Society. Reference was also made in feeling terms to the great loss the Association had sustained by the death of Sir William Gibson-Craig, Bart. of Riccarton, Honorary President; Messrs Thomas Methven, one of the council; John Beveridge and George Galloway, members; and James M'Nab and Thomas Lees, members of the adjudicating committees. Mr D. P. Laird, treasurer, read his report, which showed that the income, including a balance of £10, 6s. 1d. from last year, amounted to £48—expenditure £27—leaving a balance on hand of £21. Both reports were cordially adopted. Mr A. D. Mackenzie, of Mackenzie & Moncur, Horticultural Builders, gave a brief description of the structures shown on the Kitchen-garden plans to which prizes were awarded, and which were hung on

the walls for the inspection of the members. The following gentlemen were unanimously elected office-bearers for the current year: Mr W. H. Maxwell of Munches, hon. president; Mr M. Dunn, president; Mr Hugh Fraser, vice-president; Mr D. Laird, treasurer; and Mr Alex. Milne, secretary. From fourteen members nominated to fill six vacancies in the Council, the meeting chose Messrs A. D. Mackenzie, A. Mackenzie, Laurence Dow, Robert Lindsay, Robert Morrison, and George Simpson. On the table for exhibition were specimens of the new late-keeping kitchen Apple, Beauty of Moray, in fine condition, from Mr Webster, Gordon Castle; a new table Apple named Lady Charlotte, described as a hybrid between Ribston Pippin and King of the Pippins, from Mr George Barry, Saltoun Hall; a pot of *Leucojum vernum*, in full flower, from Mr Dow, Saughton Hall; and a collection of spring flowering-plants, including *Iris reticulata*, *Leucojum vernum nanum*, *Bulbocodium vernum*, *Primula cashmeriana*, *Primula denticulata pulchella*, and *Saxifraga Burseriana*, from Messrs Dicksons & Co., Pilgrimage Park.



PRESENTATION TO MR WILLIAM HINDS.

On the 17th of February 1879 a number of the principal gardeners in the neighbourhood of Liverpool and a few friends assembled at the Public Rooms, Aigburth, for the purpose of making a presentation to our contributor, Mr Hinds, on the occasion of his relinquishing his post as head-gardener to Sir T. E. Moss, Bart. The present was a handsome gold watch, with the inscription: "Presented to Mr William Hinds by Gardeners and Friends of Liverpool, as a token of respect, on the occasion of his leaving the service of Sir T. E. Moss, Bart. Liverpool, February 17, 1879. The gift was in recognition of the sterling worth and gentlemanly demeanour of Mr Hinds, and the able manner in which he had represented Liverpool as a horticulturnist.



NOTICE OF BOOK.

THE FERN WORLD. By Francis George Heath. Sampson Low & Co., London.

WE have already noticed this interesting and instructive volume. The work is well calculated to accomplish the end the author has in view—namely, to create an interest in, and love for, Ferns, and to teach how they should be cultivated. The volume is now being reissued as a serial in monthly parts; and we trust that in this form and manner of publication it may have a large increase of readers. The book is charmingly written, very instructive, and is profusely illustrated with coloured plates and engravings of photographs taken from nature. It should be in the libraries of all who are interested in the Fern World.



THE PHYLLOXERA VASTATRIX IN THE VINEYARDS OF FRANCE.—A Paris correspondent informs us "that the insect is spreading in all the wine-growing countries; no remedy discovered." It seems as if the prediction of Mr David Thomson, editor of 'The Gardener,' was coming to pass. Five years ago he wrote to the French Minister of the Interior, stating that going by his own experience of the insect, he believed that the only remedy was to grub the infected vineyards. Five hundred thousand acres have been already grubbed. We have since received confirmation of the reports as to Portugal and the island of Madeira from Messrs Page & Sandeman, Pall Mall.—*Maidstone and Kentish Journal*.

THE WEATHER.

THE following remarkably low temperatures occurred at the following places on March 14th :—

Mr Forbes's Nursery, Hawick,	26° of frost.
Ingleston Gardens, Ratho,	3° below zero.
Edinburgh, Craigleith Nursery,	25° of frost.
Drumlanrig Gardens,	16° „
Dumfries, Messrs Kennedy's Nursery,	12° „
Brayton Gardens, Cumberland,	12° „



Calendar.

KITCHEN-GARDEN.

THERE having been so little time to make adequate preparation for the more important garden crops, we fear in many cases the qualities of garden seeds will be severely taxed, especially where land is very tenacious and wet. Some are easily tempted to sow their seeds, thinking that "delays are dangerous." In such cases as referred to, much haste is often the dangerous course. We have distinct recollections of what young beginners have accomplished by "much haste, but less speed." We once had a goodly order of seeds placed into our hands, which had been supplied to a young beginner, who had condemned nearly all and sundry as being worthless, and would not vegetate. Though it was the second year after they had been consigned, all and sundry (except such things as French Beans, and a few others), did not only vegetate, but were first-rate kinds. The seedsman (who, however, knew nothing of the affair) had been "shunted" as a dealer in "cheap, but worthless seeds." Now where soil turns up sticky, like pitch, wet and cold, we would advise waiting till it is tolerably dry, and would cover the seeds with fine soil from a dry shed, or from a heap of congenial material; and to give battle to slugs must be a speciality. Have a quantity of ashes, shifted through a fine sieve; put the rough portion aside for burning; mix a little soot and lime with them (this is not indispensable); dust over the rows, rather thickly, by box-edgings, or near to Cabbage crops or other shelter, for

vermin, and repeat it if weather or other influences should cause it to become inert. By attention to this we have never suffered materially from the slug pest. Birds are best kept off by nets or frame-work covered with wire-netting. Arrears of every description must be brought forward with every available means at command. To give weeds a check, the hoe or prong must be applied freely. When the weeds are just coming through the soil, then is the time for attack. Leaving them till there is something to "tug at" is giving the enemy quarters of "defence and offence." When young seedlings, such as Onions, Carrots, Turnips, &c., are coming up, they are often accompanied by double their number of weeds; and if the latter are not destroyed in their early stages they do much injury to the crops. All renovations ought to be brought to a close as early as possible. Repairing of box and other edgings, edging tiles misplaced by frost, gravelling of walks, reducing overgrown collections of herbs (dividing and replanting these is the most satisfactory treatment they can receive), are some of the items of labour which require attention before the season advances too far. Let all growing crops, such as Cabbage, Broad Beans, Peas, Lettuce, &c., have the hoe or prong neatly worked among them. A sweet-growing surface is of great benefit to the plants. Cabbage and main crops of Cauliflower may be planted out from the winter stores, or what have been raised early under glass.

Cauliflower under hand-lights may be mulched with rotten manure; this will encourage free growth and help much to prevent the young plants "buttoning." If weather should be dry and warm, give guano-water in mild form; or when rain falls in what is known as April showers, remove the covers from hand-lights and bell-glasses or clocks, where they are in use, for a few hours. Crops of Peas and Beans should be sown for successions about three times during the month. Several kinds, to come in at different dates, may be sown at one time. Stake Peas before they fall over, and twist their stems at surface of soil. All the Brassica tribe of plants may be sown on a thoroughly prepared border, made firm. Small seeds require little covering, and should not be sown thickly. Drills, we need hardly say, are most suitable for these, and require less labour. The old system of sowing broadcast is almost out of date. Broccoli for main crops may be sown about the middle of month; also more Cabbage (a pinch of Red Cabbage may be of service), Brussels Sprouts, Cauliflowers, Savoy, and Kale of the various kinds. The two latter have been of much value during the late severe winter; and successions of these, as well as very late Broccoli, are useful during extra severe weather. Sow for main crop Carrots. James's Scarlet is one of the most useful; Long Surrey is one of the longest; Early Nantes and Short-horn are the earliest. Deep, well-broken ground, not too rich, suits these well; sand and fine siftings from coal-ashes pointed into the ground is an aid in supplying clean growth. Turnips, Spinach, Radishes, and small Salads ought to be sown about every 7 to 10 days. They get so quickly out of use, that it is well to have quantities in close succession. Celery may be sown on a border under a hand-light, or in a frame; but a few hoops, placed so that a mat may be thrown over when frost is expected, answers well in most cases and posi-

tions for late crops of Celery. Let the earlier crops be pricked out in frames or in boxes and protected with glass. If they are allowed to be coddled and drawn up for want of light and air, they are sure to run to seed before they are of any use. A little Beet may be sown for a first lot; but it is early enough to sow about end of month, and early in May, for main crops. Deep, well-broken soil suits this root; hot, dry, very poor soil renders the roots tough, stringy, and colourless. The main crop of Leeks may yet be sown. As soon as the early lot are ready to plant they should be placed in rich, well-cultivated soil. Early-sown crops should be examined to see that they are safe from slugs, or coming up at all. Sow again where there is danger of failure. Parsley may be sown for edgings where such is required. Plant out main crop of Potatoes, also Jerusalem Artichokes, and Seakale roots of a few inches long. Asparagus may be planted and sown to keep up supplies where much is lifted and forced. Dustings of salt and guano sprinkled lightly over Asparagus-beds coming into bearing are of much service in giving large crowns. Guano-water may be used for the same purpose. Preparation should be made for crops of Mushrooms to come in during latter part of May and in June. A bed formed in a cellar or other position, cool and away from sun and heat, is very desirable. New spawn is much safer than old. In the early part of the season, our beds made with old spawn came in thin and took a long time to start into bearing; but at present beds made with far less care are a mass of fine Mushrooms: the spawn was fresh. French Beans may be planted from pots into frames and pits from where Potatoes were lifted: those bearing may be helped with guano-water. Late crops of forced Potatoes should have the lights off them daily. In fact, the latter are only required as protection

M. T.

FORCING DEPARTMENT.

Pines.—Probably succession Pines that are usually shifted into their fruiting-pots in February have not been attended to at the usual time owing to the long-continued and

severe frost. Their having been subjected to such an unusual amount of fire-heat, and left for a month longer in small pots, has increased the possibility of their starting prematurely

into fruit when shifted and subjected to increased temperature of both soil and air. To counteract this tendency a little extra attention is necessary all through the month. They should be kept a little moister at the roots; and the atmosphere should also be more moist than would be necessary in ordinary seasons. If April be bright and dry, shade the plants slightly for three hours in the middle of the day, and keep the pits somewhat closer until it be quite evident that the plants have started kindly into growth; then do away with the shade by degrees, give more air, and in every respect adopt a hardier treatment to prevent a weakly growth. The night temperature will be high enough at 65°. Give air in the morning before the glass touches 75° with sun-heat, gradually increasing it till noon. Shut up by degrees, and entirely, sufficiently early to run the glass to 85° for a short time with sun-heat. Early-started Queens may now be pushed on with increased heat, especially on sunny days, when the house should be closed early enough to run the glass up to 85°, with a corresponding amount of moisture. Start the fire in time to prevent the heat from falling below 70° at 10 P.M. In cold clear nights 65° at 9 A.M. will be sufficient. Keep them steadily moist at the root, and occasionally give the surface of the soil a pinch of Standen's manure before watering; or water every time they are dry with water coloured with guano. As soon as these early fruiters—almost always Queens—show suckers, reduce the number to two on each plant. Smooth Cayennes, and other sorts that may have started late and that are now colouring, should be kept at 70° at night, and have rather more air on fine days, to insure fine flavour. The soil should be less moist than when swelling off; but do not now dry them off as has been recommended for midwinter ripening. Any suckers on these should now be potted, and if young stock be desired, save the old stools; and after the fruit are cut, remove all the leaves, and lay the stumps in light open soil in a bottom-heat of 85°, and they will soon start a quantity of buds that will make nice young plants by autumn. Shift winter-fruited sorts that are well rooted in 8-inch into 11-inch pots, and

grow on briskly for three months; and after being then kept cool and dry for six weeks they will start for winter supply.

Vines.—It is to be feared that pot-Vines from which ripe Grapes were at one time expected by the 1st of May will be quite a fortnight or three weeks later, owing to the severity of the first three months of forcing. They may now, however, be pushed along at a brisk pace if April prove a clear sunny month, and high temperatures can be had without hard firing. Unless on very cold nights, they may be subjected to 70° all night when shut up early with sun-heat. They must now be steadily supplied with water, and fed with top-dressings of horse-droppings, Standen's manure, and weak guano-water, up to the colouring point, when the stimulants should be less strong. As soon as colouring begins, increase the amount of air slightly, and do not increase the heat—rather let the night temperature decline a few degrees, and never omit a chink of air on all night. Owing to so much fire-heat early in the season, let a sharp look-out be kept on red-spider, and let the first appearance of it be attended to with a syringe and a little soapy water, taking care not to pull the leaf-stalks about in the process. Succession early permanent Vines that have their roots partly in inside, partly in outside borders, and that are now swelling their fruit rapidly, must have the inside border, especially near the hot pipes, frequently noticed, so that by any chance they do not get too dry. We do not approve of much sprinkling all through the day of the floors of vineries; but after bright days, when a maximum of air is necessary, let all surfaces be moistened with a syringe when theinery is shut up on sunny days, and close the ventilators for an hour or two, after which let a little air be put on the front-lights for the night, and in extent according to the state of the weather. All Grapes that are thinned may now have a higher night temperature than is desirable for earlier crops when at the same stage. At 10 P.M. on fine nights the heat may stand at 70°, falling 5°, or even 10°, before morning, just according to the state of the weather. Tie down the young growths of later houses, and thin the bunches

of free-setting sorts to about the number to be ultimately left for the crop. Disbud all Vines that are just broken half an inch, leaving the strongest buds and those best placed for being easily tied to the wires. Late Vines intended to ripen thoroughly by the end of September without being hurriedly forced should now be shut up and started, taking care that inside borders are thoroughly watered first. In the case of oldish vines, give the borders outside and inside a good top-dressing of bone-meal, and over it two or three inches of substantial farm-yard manure.

Peaches.—The earliest Peaches, when stoned and swelling freely, may have the temperature advanced to 65° at night during mild weather, and especially when the house can be shut up with sun-heat; but when cold windy nights occur, 60° is high enough. See that the inside border is properly supplied with water; and in the case of oldish free-bearing trees, apply liquid-manure. Let the moisture of the atmosphere be increased in proportion to light and heat, and syringing the trees freely every fine afternoon at shutting-up time. Examine the trees carefully, and see that they are neither over-cropped nor too thick of young wood, and remove all superfluous growths, so that what is retained and tied to the trellis has plenty of room. Disbud and pinch young wood in succession-houses; thin the fruit also, and do not let greenfly get a footing. We have known Peach crops destroyed in cool houses by April frosts, and means should be taken to prevent this by putting a little heat into the pipes—or where there are no pipes, by partially or wholly covering the glass with canvas. If mildew appears on trees in any stage of growth, dust them with flower of sulphur.

Figs.—Never allow trees producing early crops in pots to get very dry at the root, and supply them with rich top-dressing and liquid-manure. Pinch the shoots intended to produce a second crop at the sixth or seventh joint, and remove all young growths that are weakly, and are likely to crowd the trees. The temperature recommended for Peaches is suitable

to the early Fig crop. If not already done, mulch established free-bearing trees in limited inside borders with manure, and keep them moist at the root. The Fig is a moisture-loving plant, and should be freely syringed every fine afternoon, till the fruit begin to ripen.

Melons.—As soon as a full crop is set on the earliest plants, increase the moisture in the air, and if dry at the root give a good watering. Keep the night temperature at 68° or 70°, and shut up with the glass at 85° for a short time on fine afternoons. Give air rather freely every favourable opportunity, so as to produce a stiff vigorous foliage. Impregnate those in bloom at mid-day, when the pollen is in good condition. Stop the growths one leaf beyond the fruits. Sow and plant out for succession crops. A stronger loam may now be used than earlier in the season.

Cucumbers.—Mulch those in full bearing with horse-droppings or old mushroom-bed manure, and look over them several times weekly, stopping young shoots at every joint, and removing all deformed fruits and any old foliage that is crowding the newer. Shut up early in the afternoons, and syringe the foliage several times weekly. Be careful to keep a moist atmosphere and a sharp look-out for thrip and red-spider. The night temperature will be sufficient at 70°. Attend to more recently-planted crops as directed in former Calendars.

Strawberries in Pots.—Remove to cold frames all plants from which the fruit is all gathered, to be thoroughly hardened off before being planted out. Subject colouring fruit to a free circulation of dry warm air. Thin the fruit from the trusses of those which are beginning to swell: a temperature of 65° at night is high enough for those swelling off. Those in bloom set better at a temperature of from 55° to 60°. After this season it is a good plan to stand the pots of plants in all stages in pots of the same size, half filled with equal portions of loam and rotten dung. Introduce more plants into heat, and put all remaining stock in cold pits or frames, where they will now grow freely by the aid of husbanded sun-heat.

Notices to Correspondents.

All business communications and all Advertisements should be addressed to the Publishers, and communications for insertion in 'The Gardener' to David Thomson, Drumlanrig Gardens, Thornhill, Dumfriesshire. It will further oblige if all matter intended for publication, and questions to be replied to, be received by the 14th of the month, and written on *one side* of the paper only. It is also requested that writers forward their name and address, not for publication unless they wish it, but for the sake of that mutual confidence which should exist between the Editor and those who address him. We decline noticing *any* communication which is not accompanied with name and address of writer.

STOVE.—1. *Polystichum mucronatum*; 2. *Pteris tremula*. The other Ferns we cannot recognise, being young fronds, and very much shrunk up in the carriage. 3. Too small a morsel to make out what it is, especially without a flower. 4. A *Mesembryanthemum*, but without a flower cannot say which. 5. *Begonia rosiflora*. 6. *Coronilla glauca*. 2. *Begonia carminata*. 3. A *Begonia* which we do not know. You seem to have confused the numbers.

BEGINNER.—In your wet climate keep the bottom of your cold frame 6 inches above ground-level and drain it well. Your hotbed may be sunk a foot and a half, provided you can prevent water from standing in the site.

G. C. H.—You should get some practical treatise on the Vine and study it, as your questions pretty nearly require such to answer them. So far you have done very well, but to tell you how to treat the Vines from now till the time the crop is cut would pretty well fill our whole number. The best way to nourish or "feed" your Vines is to dress with rich farmyard manure, and water with the drainings of the same and guano-water alternately. Make up the remainder of your border with brown loamy turf from an old pasture with a cwt. of bones to every 5 or 6 cart-load, and make it 2½ ft. deep. This could be done in autumn as soon as the crop is cut. Get 'A Practical Treatise on the Grape Vine,' published by Messrs William Blackwood & Sons, and it will keep you right on all points.

C. L. C.—The plants you name are herbaceous without doubt.

MRS RICHARDS.—*Chrysanthemums* are best raised from cuttings annually, and this should be done in January or February at latest. As you seem to be in possession of old stools, we should advise you to divide them at once into pieces with roots attached to them and pot them in rich soil. Some cuttings may yet be struck. They will form blooming plants if not stopped too late in the season. You will find full directions for their culture in the January and February numbers of 'The Gardener' of 1877.



ERRATA.

In last month's "Notes from the Papers," at page 119, for "indignant attempt," read "malignant;" and for "quite a little ashamed," read "just a little."

READER.

THE GARDENER

MAY 1879.



GLADIOLUS-CULTURE.



THE Gladiolus as a florist's flower is of very recent date. Very rapid strides have been made during the last ten or a dozen years in bringing it up to its present standard, but the high prices which are charged for many of these newer varieties have tended to keep its cultivation in a somewhat backward condition. Like so many hardy flowers which have been improved by cultivators—more so than many—the Gladiolus deserves to hold rank amongst the noblest, the most gorgeous, the most beautiful of flowers. Amongst flowers of the same typical character, there is none that excels it, none its equal. But it is seldom seen grown equal to its deserts. Not unfrequently cultivators *in esse*, when purchasing, give their order under the express condition of obtaining the greatest possible number of corms, and in the greatest possible number of varieties. An order given and executed under such conditions is certain to include many sorts which will not give satisfaction. It is infinitely better to limit the number of varieties, and grow several of each of these, than to go in for variety at the expense of quality. The pride which many—may I say all of us?—feel in having a great number of varieties of particular plants under our own care is more a matter of sentiment than of practical utility. A dozen plants of one really good variety is practically of more value in all respects than were the dozen plants composed of as many varieties not quite so good as that particular sort. In the case of a comparatively expensive flower like the Gladiolus, it is the more necessary to guard against purchasing variety at the expense of quality. It is advisable therefore, in giving an order

for these, to explain to the florist tradesman the desire to obtain thoroughly reliable sorts without considering the matter of variety too closely. For the benefit of those who prefer to order the sorts themselves, a short list of good cheap sorts is here given. Many amateurs of limited means either grow or are desirous of becoming cultivators of the *Gladiolus*—to such this list is expected to prove of value. Adèle Souchet, Adolphe Brongniart, Elegans, John Waterer, Madame Furtado, Meyerbeer, Milton, Didon, Rossini, Penelope, Velleda, Madame Basseville. This, a more expensive selection, though the newer sorts are not included—Beatrix, De Mirbel, Marquis of Lothian, Le Phare, Le Vesuve, Lulli, Murillo, Shakespeare, Virginalis, Octavie, Orpheus, Horace Vernet.

The *Gladiolus* delights in an open, light, rich soil. Last season our stock was planted in an extra open and rich mixture, and considering the state of the bulbs at planting, I have never had *Gladiolus* finer. In 1877 the cold wet season kept the entire stock in a very backward condition; many of them were lifted, potted, and flowered during winter in the conservatory. The effect on the young corm was very bad; indeed not only were many of the flowering stock of that season destroyed without young corms being formed, but in the case of those that did prosper, they were small and badly ripened. Last planting-season pits were taken out and filled with a mixture of loam, old mushroom dung, white sand, and soot. Several corms were grown in each pit. The most of the plants grew very strongly and flowered well, and the young corms for this season's planting are large and fine. I do not know a plan that would give better results, in the case of growers of small quantities, than that above described of taking out deep pits and planting the *Gladiolus* in these in a prepared compost. Where they are grown in quantity the ground should be deeply trenched in autumn, breaking up all clods and working in a liberal dressing of light manure. In spring, on every occasion of suitable weather, the ground should be surface-pointed. This is a means of getting the soil into a sweet and open condition. In the south the planting-season extends from February to April. I find the beginning of the latter month a very suitable time for planting here. If planted in clumps, holes may be taken out with a trowel for each single corm, and the corm surrounded with fine white sand. If in beds, drills drawn to the depth of 5 inches, with a layer of sand sown along the bottom of each drill, makes a very suitable and expeditious way of planting. When the *Gladiolus* are planted—about 8 inches apart is a suitable width, and 15 inches between each row—a handful of sand is required over each, then the earth drawn over, and the ground between the rows forked over. After the growths have pushed a few inches the space between the rows ought again to be forked, and in another week or two a mulching of half cow, half horse manure spread over the entire bed. Stakes are required before the flower-spikes show themselves,

but ought to be long enough to tie the spikes to as they advance. If the spikes are intended for exhibition, shading must be resorted to, as well to preserve the lower flowers as to enhance the purity of the flowers. Spikes that come on too early may be kept in good condition placed in bottles of water and set away in a very cool cellar. Keeping a little clean water in the opened flowers is supposed to preserve these from fading so soon as they would otherwise do. Any individual flower not set straight on the spike is easily worked into position.

With regard to harvesting the corms, there is no particular hurry for this operation being performed; indeed, it may be considered somewhat problematical whether it were better to take them up in autumn or to leave them in the ground over the winter and transplant in spring. Taken up in autumn, many of them are yet quite green in foliage; allow this to ripen by placing the stock on the floor of a cool vinery, or in any other place where like conditions are obtainable. When the foliage becomes yellowish it separates readily from the corm. The roots should be cut off at same time, but not too closely, the young brood carefully picked from the base of the corm, and preserved, and these latter stored away for the winter. I leave all the old coatings of the corm intact until before being planted, as it is a most efficient means of keeping them from the air during winter. They winter very well thus, laid on shelves in a cool room. The young brood I pack away amongst dryish sand until spring, when they are planted out thickly in rows. The ground is carefully prepared, drills drawn 9 inches apart, a little sand sprinkled along the bottom of the drills, and the bulblets pressed in 4 inches apart. They are left here till they flower, which will be the second year after planting with most of them; they are afterwards treated like the other flowering stock.

Those who incline to raise seedlings from seed of their own saving would be obliged, in Scotland, to start the plants intended for seeding earlier. Good kinds alone should be grown for this purpose. The seed-bearing plants ought further to be cross-fertilised with pollen from other good sorts. As the seed-pods show signs of approaching ripeness, watch them, and pick off the pods as they become ready, laying them out in a dry and warm structure to finish. Use boxes for raising and growing the seedlings in, sowing about the beginning of April in a rich open compost. Cover the surfaces with moss and keep moist. A very slightly-heating dung hotbed and frame is a very suitable place for the purpose of giving the seedlings a start. Air must be admitted gradually at first, increasing it until the plants are grown in the open air. In order to have good bulbs that will flower the ensuing year, there must be no neglect in the matter of watering. On the approach of cold days and nights in autumn, it will be beneficial to have them removed to a cool structure to finish growth. Allow

them to remain till spring in the boxes, when they are treated like the rest of the stock. Those who do not like the trouble of saving seed themselves may obtain it from some of the larger seed firms. It is not, however, a profitable way of getting up a collection, as very few of the seedlings will be found worth growing. If the characteristics of this flower were fixed, as they may be some day, so that good varieties could be depended on being produced from seed, the cultivation of the *Gladiolus* would be increased to an infinite extent.

R. P. BROTHERSTON.



NOTES FROM THE PAPERS.

ENGLISH nurserymen and seedsmen pride themselves on the bewildering length of their lists of plants, seeds, and novelties; but one American firm at least, the Messrs Ellnanger & Barry of Rochester, N.Y., set a praiseworthy example by shortening theirs—and at no inconsiderable trouble to themselves, it would appear. In the preface to their catalogue for the present year they state “that so soon as novelties after careful trial do not answer to their descriptions and the expectations raised by them, they are at once stricken from the list. By this means we avoid a bulky catalogue, and a vast amount of disappointment and vexation to customers.”

And under the head of “Discarded Roses,” we are told that, “Having commented upon the new Roses, it will probably be interesting to note in order varieties which we have rejected, with our reasons for so doing. Among the Teas are *Hortensia*, of poor form and colour; *Louise de Savoie*, not sufficiently distinct from *Le Pactôle*; *Madame Celina Noirey*, a coarse flower of dirty colour; *Madame Camille* has the same faults; *Madame Halphen*, too much like *Isabella*; *Monte Rosa*, poor, and does not open well; *Perle de Lyon*, poor habit, very liable to mildew; *Safrano a fleur rouge*, a poor grower; *Souvenir d’Elise Vardon*, too coarse.

“Among the Hybrid Perpetuals we have thrown out the following: *Antoine Mouton*, an inferior *Paul Neron*; *Charles Turner*, an inferior *General Washington*; *Col. de Rougemont*, an inferior *Baronne Prevost*; *Dr Arnal*, too small, and not of good form; *Docteur de Chalus*, an inferior *Général Jacqueminot*; *Dupuy Jamin*, neither full nor distinct; *Etienne Dupuy*, a shy bloomer; *General Von Moltke*, very shy bloomer, and burns in sun; *Henry Bennett*, a shy bloomer; *Monsieur Boncenne*, an inferior *Baron de Bonstettin*; *Perfection des Blanches*, an inferior *Coquette des Alpes*; *S. Reynolds Hole*, an inferior *Louis Van Houtte*; *President Leon de St Jean*, opens badly, and a shy bloomer; *Triomphe de l’Exposition*, an inferior *Charles Margottin*; *W. Wilson Saunders*, shy bloomer, and a poor Rose; *Lyonnaise*, *Madame Georges Schwartz*, *Madame Marie Finger*, all of the *Victor Verdier* type, are similar but inferior to varieties of the same type retained.”

The ‘*Pall Mall Gazette*’ is not an infallible authority on horticultural matters, but that does not hinder it from having very decided opinions on the subject of gardens, nor expressing the same in its own peculiarly dogmatic way. It does us no harm sometimes “to see ourselves as others see us,” even though it may happen that those who do “see us” are not gifted with wisdom in all things, nor endowed with much discriminative perception. We therefore extract the following fragment from a lengthy article in your Lon-

don evening contemporary on the subject of "Enjoyable Gardens:" "Horticulture is a misnomer for viticulture. Instead of a ramble along greensward in the free air, laden with fresh scents, he traverses weary miles of glass-covered walks of brick, in an artificial languorous atmosphere, surrounded by flower-pots and water-pipes. The whole thing is only a shade less distasteful and tiresome than a laboratory. Perhaps, in addition to this enthusiasm for glass, the host has a passion for Latin names, which he insists on inflicting on men who neither know nor care about the niceties of floral classification. This horticultural pedantry is particularly disgusting, because it really gives no single atom of instruction, and has no single element of suggestive knowledge about it to those who have not been trained in the subject. And you mostly find, too, that the horticultural amateur, who is most tediously particular about his Latin names for things, has the least possible knowledge of the general ideas that belong to the study of botany. His knowledge is all empirical; it has no growth in his mind, and only consists of a bundle of detached and disconnected labels. Botany, rightly studied, is one of the most instructive and useful, as well as one of the most delightful, of all the concrete sciences, because it is so simple and so perfect an example of a truly scientific classification. But your fine horticulturist, all glass and Latin as he is, extracts as little as possible of the true worth of his study from his vast legions of flower-pots and specimens and labels. One wonders why these people, who bore one to death with the special names of this flower and that, do not insist on letting you know the exact name of the Grapes, Strawberries, and Cherries at dessert, all in botanical dog-Latin. Of all impostors, viticulturists seem to be the most egregious. They are endured, and their tribes wax more numerous, because they offer a good opening for that vulgar ostentation which is so charming a feature of our society."

'The Gardeners' Chronicle,' which is rather credulous on the subject of "sports" and suchlike, gives prominence to the following paragraph borrowed from the 'Philosophical Transactions,' 1720 (!): "About six years since," says a Mr Henry Cave, "I planted against a wall a cutting from a Muscadine Vine, on an eastern aspect, where it has the sun from its rise till half an hour after twelve. The soil is a stiff clay; but to make it work the better, I meliorated it by mixing some rubbish of the foundation of an old brick wall, where it now grows. Two years since it shot out at both ends, about 22 inches of a side, before it came to a joint. That on the right was a very luxuriant, exuberant branch, as large as the body of the tree, the other side not half so thick; and the leaves on the right were as large again as those on the left, and I fancy the largest that ever were seen. The right hand bears a very large and good black Grape, and large bunches; the left hand very good white Grapes, and I had last year more bunches of the white than of the black; and whereas in all Vines bearing black and blue Grapes the leaves die red, these died white on the black side as well as the other. Last January I pruned the tree again, but tacked up more of the right hand (being black) than I did on the left, for which reason I had this year a great many more of the black than I had of the white, and they ripened for the season of the year very well. I gathered the last about eight days since (October 23), and the leaves die white this year also, being the second year of bearing." Parallels to the "Culford Apparition" take some hunting up!

It has been proved by repeated trials at Chiswick and elsewhere that a large proportion of the names in vegetable catalogues are simply synonyms. In other words, many of the names in seed-lists do not represent distinct or new

varieties, but as often as otherwise some old sort of good repute that has sometimes by accident received another name; but quite as often the variety has been rechristened with the deliberate purpose of foisting it upon the public as new, and making capital by the transaction—otherwise, “obtaining money under false pretences.” How this is done is occasionally amusingly illustrated, and to the discomfiture of the impostor. The jugglery is accomplished in this way: A. raises a new and excellent variety of the Cabbage tribe, we shall say, and perhaps distributes it locally or extensively, as the case may be. By-and-by B. comes on the scene, gets a pinch of A.’s seed, which he sows; and being of an enterprising turn, saves the seed, and perhaps exhibits samples of the variety as well under a new name. He has probably only harvested seed from the first sowing; but being desirous to realise as soon as possible, he sends it out or sells it to some member of the trade, who brings it out with a considerable flourish of trumpets as a new and particularly excellent thing, originated by Mr Plausible, after years of careful selection; and of course Mr Plausible is ready to declare, if needful, that not a soul holds a particle of seed of the valuable strain but himself: and thus it falls out that the favoured tradesman is enabled to sell A.’s Cabbage-seed about five hundred per cent above his neighbour, who disposes of it under its original name. By-and-by the gardener or his employer finds out that he has been duped; but Mr Plausible has pocketed the cash, and there is no redress—he is left to bite his nails.

The ‘Agricultural Gazette,’ speaking of manure, says: “The superiority of farmyard manure over every other fertiliser may be accounted for as follows: It contains from its very nature all the necessary constituents of plants, just as surely as jam contains the constituents of the fruit from which it was made. Besides the active ingredients, such as phosphates, sulphates, chlorates, nitrates, &c., which are the very essence of all artificial manures, it contains a mass of organic matter which, during its decay, gives up carbonic acid to the soil, and thus acts as a solvent upon the mineral ingredients therein contained. As it decays slowly, it surrenders its good qualities gradually, and hence has more ‘stay’ in it than most manufactured manures—which, as a rule, require to be applied just when or immediately before the crop is growing most rapidly. Farmyard manure is found to improve land more than any other fertiliser. The farmer who keeps a large head of stock permanently increases the capabilities of his land, whereas purchased manures generally increase the yield of one crop and do not affect succeeding crops except indirectly, as previously pointed out, by increasing the manure-heap. In this respect there is a strong resemblance between the action of dung and that of oil-cake fed on the land with sheep. When the nature of the land allows of this last treatment, it is more than probable that the condition of the land will be kept up as well as by dressings of dung. This permanent effect of dung, whether in the form of farmyard manure or sheep-droppings, gives it a real superiority over purchased manures, and is likely to maintain its reputation among farmers in spite of the efforts of some persons to present it to our attention from a coldly chemical point of view. In this connection we might apply the words of Hamlet to those who judge fertilisers entirely by analysis—“There are more things in heaven and earth than are dreamt of in your philosophy.” Let us be even willing to admit that in the economy of nature there may be reasons which agricultural chemists have not yet sounded that may give the dung of animals and *débris* of plants a special use in the production of fresh vegetable forms. Such docility of mind is much wanted at the present time among theorists; but

those who are in constant and direct contact with nature are accustomed to surprises, and learn to listen with respect to the opinions of "ignorant" men, who, although ignorant of letters, are yet well versed in observing the faces of the sky and the earth, growing crops and animals, whether thriving or pining. The season labours slowly on towards spring. In this time of hurry-scurry, of microphones and telephones, Nature seems to be falling behind. We cannot get our ewes to go less than 21 weeks in lamb, or our cows to carry their calves less than nine months; wheat makes its appearance with painful deliberateness—spring corn, as usual, taking two steps forward and one back. This slow evolution of natural events is, in fact, most interesting and instructive. It constitutes a fundamental difference between manufacture and agriculture. It must be taken into account in all speculations as to future progress, and it must discount all too sanguine expectations as to possible improvements in the farmer's art.

Flower-growers for market have not hitherto had so much to fear from foreign competition as the fruit-growers; but if the following extract from one of the London papers speaks truly, troubles are in store for them—probably at no distant date: "A few days ago a box reached London from Nice containing all sorts of cut flowers, as brilliant in hue and as richly perfumed as if they had only just been plucked. Double Violets and Rosebuds were conspicuous, and, like the rest, had been grown in the open air, thus saving the expense of artificial heat. But the most remarkable thing was the wonderful freshness of the flowers, although no special pains had been taken in the packing. The experiment, therefore, succeeded completely in proving that these very fragile goods can be conveyed from the shores of the Mediterranean to London in as good marketable condition as if grown in England under glass."

We alluded some time ago to the valuable services of the Scientific Committee at South Kensington. We regret now to learn—in response, it would appear, to our remarks—that the "collective wisdom of the experts" who compose that body is over-taxed, in consequence of the disease-affected subjects submitted to it for examination and inquiry being, as a rule, too far gone. There used to be a story current at Kew once about a learned botanist in that establishment who had a Drumhead Cabbage submitted to him that he might name and describe it. After scrutinising the production critically for a length of time, he put it aside, with the intimation that he would require to see a flower of the plant and know some further particulars concerning it before he could venture to say to what species it belonged—"it was new to him." This is exactly the position of the Scientific Committee. "Specimens of Cucumber disease and what not," we are informed, are in their fullest stage of development when submitted to the "experts;" hence they decline to saddle themselves with the task of determining either the cause or the cure in any case. One is rather surprised, not to say disappointed, at this state of things. The Scientific Committee is composed of men who, it is generally supposed, have been educated for duties which are entirely self-imposed. Then they have the run of Kensington Gardens, Chiswick, and above all, Kew, where the same authority as we have quoted once told us, "investigation of the vegetable scourges which ruin our crops is largely carried on;" and this takes no account of the active aid rendered by the talented directors of these establishments. We do not know what else could be done for the learned Committee, unless it be the establishment of a hospital for sick plants at South Kensington, where the members could hear clinical lectures. The "experts" refer in particular to the Cucumber disease, which has been a favourite as well as a standing

dish ever since the Committee commenced its labours. In fact, it has been jocularly asserted that but for it, the Phylloxera, and an occasional blistered Peach-shoot, the Committee's occupation would be almost gone. It is a curious circumstance, as regards the Cucumber disease, that not one of the "experts" has ever had an opportunity of seeing it till after "the originating cause had become obliterated," seeing that the disease is usually present in all stages of development on the same plant! Under these circumstances, gardeners having Cucumber plants predisposed to the disease would do the Scientific Committee a kindness by sending the same to South Kensington—not to speak of the service they would render to science. Of course, in such a case the sender would have to certify in a satisfactory manner that the disease was "a-comin' on." It would be unreasonable to tax the "collective wisdom" too far. As the experts themselves candidly admit, "it is to gardeners and foresters, trained to observe the beginning of things, that they look for at least the clue to many of these maladies." Without such aid the experts, we are told, "can only wag their heads" over the subjects submitted to them; and it follows, of course, from what has been before stated, that this wagging of heads must enter rather largely into the deliberations of the Scientific Committee.

But we think the Scientific Committee might also reasonably complain on other grounds. We do not by any means endorse the opinion emphatically expressed on one occasion by a well-known horticulturist that the Committee were "a parcel of humbugs;" but it is not a flattering circumstance that the general gardening fraternity exhibit so little faith in the South Kensington body, and that, notwithstanding the troubles the gardener has to contend against in the way of vegetable scourges, he rarely thinks of appealing to it for help. On the other hand, it has been said, and we believe with great truth, that many of our well-known horticulturists and writers for the press have as many inquiries addressed to them in one season as would keep the Scientific Committee employed for two or three; and we believe the former would gladly turn part of their work over to the latter if they could. As it is, we can but sympathise with the "experts" in their commendable loyalty to the claims of science, which they exhibit by their regular attendance at "meetings," in the sustained hope that "something will turn up."

READER.



THE THINNING AND SWELLING OF FORCED PEACHES.

It is impossible to over-estimate the value of forced Peaches as a desert fruit; but what a difference there is in the appearance and quality of fruits grown under different systems of cultivation!

It is a well known fact that soil, climate, and the capacity of houses have a good deal to do with the success of many eminent cultivators of the Peach; and it is equally well known that there are cultivators who have to do battle with the worst elements that are emitted from the numerous factories and chemical works which abound in the great manufacturing districts of Lancashire and Yorkshire, and yet they are equally successful. Let us take, for example, the fine samples of Peach culture exhibited by Mr Jamieson, gardener to the Earl of Crawford, Haigh Hall, Wigan, at the summer show of the Royal Horticultural Society, at Pres-

ton last year, which, if I remember rightly, gained first honours. These fruits were grown in a soil and climate which is not famed for its beneficial effects upon vegetation. What, then, was the cause of such excellent results? Superior cultivation we should suppose, and nothing else. Well, setting aside isolated instances of first-rate cultivation, and coming to what is seasonable work just now, we may be able to point out how good results may be obtained by attending to a few standard rules, which are better known than they are acted upon. In the first place, the favourable season of last year left the wood of Peach-trees in the pink of condition, where it was properly thinned out and where the roots were liberally supplied with water during the autumn.

The winter, it is true, has been about the worst on record for early forcing; and yet early Peaches, set as thick as Peas, without any artificial impregnation beyond shaking the trees, upon occasions when the weather admitted, of giving a little air, and keeping an atmosphere drier than usual.

Disbudding, and thinning of shoots and fruits, will have been the order of the day for some time past.

Trees—it matters not how healthy they are—that are overladen in the early part of the season with superfluous shoots and fruit are doing unnecessary work, which destroys the prospect of fine fruit as effectually as if they had been cut through with a knife. It has been a necessity with us for some years past to have to resort to a good deal of scheming, on account of having to grow Peaches on narrow trellises, which necessitated a course that is not usual under other circumstances. The difficulty in such cases is, that the vigour of the tree being directed upwards to the extremity of the trellis, the very best wood is formed where it has to be cut away, causing a loss of sap which, if it were possible to direct and retain in the lower portions of the tree, would exercise an invigorating influence productive of the best results. Disbudding has, therefore, to be performed by careful stages, to encourage a regular growth, but not to interfere with the natural motion of the sap by removing too many shoots at one time. The fruits were thinned out at once, leaving those of a bronzy tinge (an appearance indicative of good health) at the base of the shoot, which was intended to have its full run of growth—a few spurs being also formed to fill up vacancies which may have occurred by accident, or through any defect in training. After the crop is regulated, the trees should be gone over, and each shoot of the preceding year should be examined as to the number of shoots of the current year that was left upon it when it was disbudded: these should be thinned out, or cut back, according to their respective positions in the tree, to a healthy young shoot which promises to travel a good length, with a fruit at its base, on the upper part of the trellis, where it would receive all the advantages of warmth and sunshine, which is so beneficial to the development of fine fruit. Now, suppose

a shoot of any given length is disbudded to, say three or four young shoots, in order to secure a heavy crop and plenty of growth, and that there is a fruit at the base of each young shoot ; as soon as it is seen which is the most promising fruit nearest to the base of the shoot, the branch might be shortened back with a sharp knife to that shoot, leaving the space for one fine growth where two or three would have been crowded before. No danger need be apprehended from this practice, as the Peach, like other stone-fruits, is never subject to canker or gumming when it is cut in a growing state, provided the operation be judiciously and carefully performed ; and the flow of sap that was going to support two or three shoots before would be concentrated in one, which would also be the case with the fruit. And thus an improved condition of things would be brought about, both for the present and following year.

The same principle might also be applied to large trees which are showing symptoms of exhaustion through overcropping, or, what is quite as great a source of evil, overcrowding of shoots, which not only drains the tree of its power and resources to feed, but also misapplies and misdirects what little power is left, as well as prevents the wood from being exposed, as it should be, to sun and air.

Next to thinning of fruit, disbudding, and the shortening back and thinning of shoots, is a steady supply of liquid manure to the border, and the maintenance of an atmosphere which is calculated to produce fruit of first-rate quality. I think in a former article on the subject of supplying fruit-trees with liquid manure, it was recommended that liberal supplies should be given in the autumn before the fall of the leaf. Where this has been attended to, and the border is already enriched, there will be the less necessity for giving much at the present season ; but a good deal depends upon the condition of the trees and their root-capacity for absorbing food. A steady night-temperature of 65° , and a day-temperature of 75° to 80° , with a moist surface, will be sufficient till the leaves have taken their last swelling, when increased moisture and a high day-temperature should be kept up.

It appears to me, from close observation, that there are some excellent attempts at Peach cultivation frustrated for want of due reflection upon the conditions under which the Peach swells its fruit most freely in its last stages, and the reason why some fruits are so much superior in appearance to others, except in size. Look at a score of dishes arranged for dishibition, and examine the "finish" of each dish carefully, and see if the fact is not clearly established, that those which present that handsome appearance, which is conspicuous by the skin being distended to the utmost degree of tension, and which is the most transparent to the sight, are not those which have been grown in a high moist atmosphere of from 90° to 100° for a few hours each day, and which have received no check by lowering the temperature abruptly before the swelling process was fully completed ? Large, coarse-looking

fruits may be clearly traced to the system of cultivation above referred to, whilst small fruits of inferior quality are as clearly traceable to starvation and an inferior system of cultivation generally.

W. HINDS.



HEATING BY HOT WATER.

HAVING for the last few years spent considerable time in experimenting on the circulation of hot water (as an amateur), I was pleased to read Mr Hammond's remarks in the February number of 'The Gardener,' and I unhesitatingly endorse the same, as they agree with the results of my experience. His remarks are so lucid, that it would be impossible for me to render them more intelligible had I felt inclined.

This season I have made an alteration from the old system to that described by Mr Hammond—viz., the water, immediately it leaves the boiler, runs down an incline to the houses to be heated, and the pipes round the houses are on a level, and drop about 13 inches on entering the boiler. The valves (Messenger's) are fixed to the returns about a foot distant from the boiler. Any person interested would be pleased at the rapid circulation denoted by the thermometrical readings during its circuit, and the slight variation of temperature between the water in the flow and return as it enters the boiler, compared with others where the flow rises above the level of the boiler and then drops as a return.

Any persons who doubt this statement are welcome to give me a call and judge for themselves.

J. H.

THE MILLS, SWALLOWSLIFFE,
SALISBURY, WILTS.

In last month's 'Gardener' two of your correspondents question the correctness of my statements in 'The Gardener' for February in reference to the above subject; but after reading carefully what they say, I fail to see that they prove any of my statements wrong. Mr Inglis is of opinion that I "make too much of the inclination of the water to form a *return-current* in the *flow-pipe*, and too little of the fact that the water in the return-pipes is very much heavier,—that this heavy column is *pulling*, as it were, a lighter one, and at the same time is *pushing* it from below." Now, as regards this sentence, I may say that I consider both columns are equally concerned in the process of circulation; but I object to the water in the lighter becoming colder than it was at the time of leaving the boiler until the highest point of the apparatus is reached. As by it doing so before reaching this point, the relative difference in the weight of the water in the two columns is lessened, and, consequently, circulation is retarded. Mr Inglis next says, "that

whether the rise in the pipes is made by a slow gradient, or by a vertical rise, will not make material difference to the circulation; but every foot that they are thus elevated above the boiler gives greater force to the circulation of the water." This sentence is a very important one bearing on the subject under discussion, and if its conclusions are right, then all I have said on the matter is wrong, and therefore worthless. Let us examine the first clause. It says—whether the rise in the pipes is made by a slow gradient, or by a vertical rise, will not make material difference to the circulation. Now, I maintain that, when the highest point of the apparatus is reached by a slow gradient, the result is a return-current in the flows. In an apparatus of a few hundred feet of piping, this return-current is not so marked as in an apparatus where the piping extends to thousands of feet; but it occurs in both. The water owes its expansion and relative lightness to heat in the first instance, and as heat fails, the water contracts and becomes relatively heavier; it therefore follows that the heated volumes of water should reach the highest points of the apparatus before any diminution of their temperature takes place; and when this point is reached by a slow gradient of, say 200 feet, I think Mr Inglis will admit that they cannot do so without becoming colder than they were at the time of leaving the point on which the fire acts. And I think he will also admit that every inch the water has to be raised after it commences to cool is an extra tax on the *pushing* and *pulling* powers of the colder and relatively heavier water in the return-pipes. The slow gradient is therefore to be avoided as much as possible, as it leads to a waste of force, and, consequently, retards circulation.

We will now look into the last clause, which says that every foot the flow-pipes are elevated above the boiler, gives greater force to the circulation of the water. Mr Inglis is not singular in holding this opinion. Hot-water engineers are very decided about elevation of the flows above the boiler being essential to rapid circulation of the water in the apparatus. They will sink a hole in the earth 20 or 30 feet deep—unless prevented by some insurmountable obstruction—to obtain elevation for the flows above the boiler, and after the flows reach the surface from so low a level, they are again elevated to their farthest points from the boiler in the various compartments to be heated, so that circulation may be more rapid still. Thus it might be supposed that the rapidity of circulation was proportionate to the elevation of the flows above the point on which the fire acts. Let us see if this is really so, by supposing 5 feet to be the distance to which the flows are elevated above the boiler in an apparatus of, say 3000 feet of piping, and that it takes an hour and a-half from the time the fire is lighted until all the water in the apparatus has passed through the boiler. Now, if the elevation had been 10 feet instead of 5 feet, would the water have made the circuit in less time—say an hour and a quarter; and if the elevation had been 20 feet, would it have performed the journey in three quarters of an hour? If

the elevation of the flows above the boiler determines the rate of speed at which the water moves, then it would be possible to attain elevation sufficient to drive the water through the apparatus at a speed equalled only by that of the electric spark.

The rapidity of circulation of the water in the heating apparatus is not measured or determined by the elevation of the flows above the point on which the fire acts, but by the difference of the specific gravity of the volumes of water in different points of the apparatus. The volume of least specific gravity will at all times occupy the highest, and that of greatest specific gravity the lowest, point in the apparatus, unless prevented from doing so through the defective adjustment of the latter, which is not of unusual occurrence. Mr Inglis seems to think there is some analogy between circulation as it takes place in the heating apparatus and emptying a cistern by means of a syphon. A little consideration will convince him that the two processes are not analogous. Circulation does not empty the apparatus. The latter is an endless tube full of water. At one point of this tube heat is applied, causing the water to expand and become relatively lighter; while at all other points the water is contracting and becoming relatively heavier—hence circulation.

We will now look into C. M.'s paper.

In reference to my statement that the particles of water are unable to transmit heat to one another, C. M. asks, if this be so, "How does it come to pass that water poured upon ice imparts its heat to it, the ice being then a solid?" In reference to this question, I may remark that hot ice would be a curiosity. And the question implies, that by pouring hot water upon ice the latter becomes hot. I think, however, that it is impossible to heat ice either by pouring hot water on it or by any other means. When in contact with a hotter medium ice does not expand, and C. M. says "all bodies expand by heat." Ice, however, is an exception to this rule, as, under the influence of heat, the expanded particles of water of which ice is formed contract until reaching a certain point, when they resume their liquid condition and are no longer ice, the contracting and melting being confined to the external particles, those in the interior not being affected by the thawing of those on the exterior of the mass. To test the correctness of this, drop a ball of ice into a vessel containing hot water, let it remain for three or four minutes, then take out what remains unthawed of the ball and drop it into a vessel containing cold water, and the remaining portion of the ball of ice just taken from the hot water will not raise the temperature of the cold, but will have an opposite effect,—thus proving that solid particles of water are unable to transmit heat to each other by conduction. And C. M. says solids transmit heat "by conduction only." Now as the particles of water in a solid state, in the form of ice, are unable to heat one another by conduction, the most reasonable inference is that they are unable to do so in their liquid state. The next matter claiming attention is where C. M. says, "the fact is, water transmits heat to water in the same degree as it does to any other body." Well, "facts are chieftains that winna ding." Assertions, however, are not always facts, and we will consider the above as only an assertion, and take it to mean that water parts with heat to all bodies in the same degree. It is true water parts with heat to all other

substances with which it comes in contact that are of a lower temperature than itself, but the degree of rapidity with which it does so is measured by the conducting power of the material acted on; thus iron, being a good conductor of heat, is the material most used in the construction of the heating apparatus. I wonder how wooden pipes would act in warming our plant-houses? If it is a fact that water transmits heat to all bodies in the same degree, then wooden pipes should heat our plant-houses equally as well as those of iron. Again, C. M. assumes that, supposing the particles of water transmitted heat to each other in the same way as those of solid bodies, "it would make no difference whatever" to the circulation of the water in the pipes, as "the expansive properties of the water would remain the same." Now I venture to think the expansive properties would be considerably lessened. It is owing to the inability of the particles of water to heat one another that their expansion is so much greater than what takes place in solids when exposed to the same degree of heat. It is also a mistake to suppose that expansion is the cause of circulation. Expansion is from the centre, and acts with equal force in all directions—it therefore cannot cause the water to move in one direction only; and that is what takes place in a properly-adjusted heating apparatus. Heat and expansion are the first promoters of circulation, but cold and contraction are as much concerned in the continuance of the process. Neither, however, is the cause, they are only the agents by which the cause is brought about—that is the difference in the specific gravity of the volumes of water at different points of the apparatus, which is the cause of the water circulating in the pipes.

C. M. next says, "If it were possible to apply sufficient heat to liquefy bodies, (I presume he means solid bodies), circulation would take place in the same manner." Well, there is no use in discussing impossibilities. I may remark, however, that C. M.'s impossibles are possibles, and *vice versa*. We could use for a boiler a blast-furnace. In it the "*bodies*" would liquefy—the difficulty would be about circulation. Yes, circulation and not liquefaction would be impossible, unless we turned the whole apparatus into a blast-furnace, and cultivated those fabulous fire-eating animals called salamanders, instead of fruits and flowers. Then, to prove that I am wrong about the return-current in the flows when they are fixed upon an ascending scale from the boiler, C. M. gives what he no doubt considers the right theory of the circulation or movements of the water in the boiler and pipes. According to his theory circulation occurs in the following way: "The water in the boiler, on being heated, expands, consequently it then becomes lighter than the water in the pipes, hence its tendency to rise. And as the water from the flow, which proceeds from the top of the boiler, cannot descend without mixing and equalising the temperature of both, therefore the water from the return, which is situated at the bottom, rushes in and gets heated likewise, and continues to expand and ascend the flow-pipe, equalising and forcing the cold before it." As this theory of circulation differs from all others that I have either heard or read about, I propose to distinguish it by calling it the equalised mixed forcing theory. It supposes that the hotter and relatively lighter water ascends from the boiler to the flow-pipes, which is true, that the colder water in the flow will not descend to the boiler, and that the heated water on entering the flow commences a twofold action—that is, equalising the temperature, and at the same time forcing the cold before it, which I venture to think is not true. The hotter and relative lighter water cannot force the colder and heavier water before it on an uphill course. Still C. M. thinks the above theory of

circulation is correct, and in the closing sentence of his paper says that "That part of the structure which is situated farthest from the boiler will be the hottest, the pipes being at the highest elevation;" which goes far to prove that a continuous rise in the pipes does not hinder circulation, but the reverse. The only inference that can be drawn from this sentence is, that the water on its journey from the boiler to the highest and farthest point of the apparatus suffers no diminution, but, on the contrary, increases in temperature. This may be so where the apparatus is fitted up on equalised mixed forcing principles. The mixing required to equalise the temperature of the hotter and colder water, and the force required on the part of the equalised water to drive the cold water before it uphill, may have the effect of generating heat, so that the water on reaching the point highest and farthest from the boiler may be hotter than when it left the point on which the fire acts. I think, however, that C. M. is mistaken in thinking so; but if he can prove that it is so, then, ye inventors of fuel-economising boilers, your occupation is gone, and coal bills will no longer vex the gardener! For if the water gets hotter after entering the flows, then all that will be required will be a little fuel to start it out of the boiler in the first instance, the mixing and equalising will do the remainder. And if the water *parts with no heat until it reaches the highest point of the apparatus*, as indicated in C. M.'s paper, would it not be best to have this point as near the boiler as possible? By having it so, the mixing, equalising, and forcing would be reduced to a minimum, and consequently a more rapid circulation of the water in the pipes would be the effect.

J. HAMMOND.

BRAYTON HALL.



CHOICE HARDY SPRING FLOWERS.

THE taste for hardy spring flowers is developing more rapidly than the taste for any other class of hardy flowers. The reasons for this are obvious. There is no difficulty experienced in keeping the garden well stocked with flowers during summer and autumn by means of either hardy or tender plants, but in spring we must fall back on the good old-fashioned floral gems of the season, if we would have any delight in our gardens at all during the cold months of spring. To assist in the cultivation of the growing taste for these early flowers, I would venture on making a selection of the best of the earlier and later species and varieties, including only such as are most beautiful and easy to manage in any garden.

Adonis vernalis.—This is the best of the genus to which it belongs. It grows to the height of about 1 foot—the stems being clothed with finely-cut leaves, and terminating in large, bright-yellow flowers, which open in March and April in ordinary seasons, but this season they are fully a month later than usual. *A. apennina*, a closely related form, if not a mere variety, begins to flower as *vernalis* ceases, and is therefore useful in prolonging the period of flowering in collections that are large enough to admit of two such closely related plants of almost identical features and colour.

Anemone apennina is one of the most beautiful of spring flowers. It rises to the height of about 6 inches, including the flowers, which are a bright blue. It flowers sometimes as early as February, but only in mild seasons and in warm localities ; more generally it appears in March. A fine companion to it is *A. nemorosa*, the white *Wood Anemone*, the double form of which is an excellent subject to grow largely for cut flowers, as it stands well when cut.

A. fulgens cannot be surpassed for the brilliancy of its large starry flowers of dazzling crimson. As with most *Anemones*, the flowers are most profuse ; and the plant thrives so generally well in gardens that it should become a popular favourite—indeed no garden should be without a few of it. The *Poppy Anemone*, *A. coronaria* and the varieties, *A. hortensis*, the *Garden A.*, are also indispensable, while they are also the most easily cultivated of all spring flowers. *A. pavonina* (bright-red), *A. pulsatilla* (purple), and *A. sylvestris* (white), are each beautiful, distinct, and worthy of attention where there is room for variety ; but if only two or three may be grown, I would recommend *fulgens*, *apennina*, *hortensis*, *coronaria*, and *nemorosa pleno* as being the cream of the lot for spring flowering.

Caltha palustris.—The double form of this is not one of the earliest of our spring flowers. Still in ordinary seasons it begins to open its fine golden-yellow flowers in April, and continues to display them during the following two or three months. It is a very gay if a somewhat common-looking plant, and is worthy of a place in every garden where gaiety is desired.

Eranthis hyemalis, the *Winter Aconite*—one of the most common of spring flowers, and one of the earliest to appear. It is no unusual thing to see it pushing its flowers and leaves through the melting snow in February. It thrives everywhere—even in the smoky atmosphere of towns—and is therefore most valuable as a town garden-plant.

The Christmas Rose (*Helleborus niger*) is too well known and admired to require recommendation. Some forms of it flower very early in the year, often in mild seasons throwing up flowers in November and December. Others, such as the variety called *major*, are somewhat later, while the flowers are larger and more beautiful in colour ; but all are worthy of culture, and should be grown largely where considerable demand is made for cut flowers during the winter months. A few plants lifted and put in a cold frame before winter sets in will yield a fine crop of purely-coloured flowers, which are apt to be dragged and soiled when left to the full exposure of the weather.

Hepatica triloba.—All of these are worth growing more abundantly than they are. They are profuse and bright, and very early flowers. Only three colours are given by them—red, white, and blue. There are double forms of the first and last, and a double white is mentioned in books as having been in cultivation, but it no longer exists in gardens, if ever it did—although some aver that they have met with it in

this generation. The double blue occasionally throws up a few dirty-white flowers in autumn, which, so far as I can trace, appears to be the only ground that can be given for the alleged existence of the variety, in recent times at least. *H. angulosa* is a very fine and distinct species, differing from the *triloba* varieties in having larger flowers and foliage.

Sanguinaria canadensis.—A very pretty and interesting plant, alike in flowers and leaves. The flowers, like those of nearly every member of the natural order to which it belongs (*Papaveraceæ*), are fugaceous. They are white, with a tint of pink suffusing the petals. The plant likes a moderately shady position, but otherwise is most easily accommodated both as regards soil and situation, adapting itself well to almost every variety of soil. The flowers appear in March and April.

Alyssum saxatile.—A most beautiful and profuse-blooming plant, with persistent, somewhat hoary leaves and close decumbent habit, clothing itself with numerous clusters of small but innumerable bright golden-yellow flowers in April and the two succeeding months. There are several varieties, the best being either *A. s. compactum* or *A. s. gem-onense*. The former is the best adapted for the purposes of spring bedding.

Arabis albida and **A. alpina** are very profuse and showy white-flowering *Rock Cresses*, flowering in April, or earlier, according to the nature of the weather. They are closely matted in growth, and the flower-stems rarely exceed in the largest—which is the first named—more than 9 inches in height. They are plants requiring the simplest attentions in the matter of cultivation; but one point requisite to their being grown to perfection is, that they should be renewed annually, either by cuttings or division. When left to grow at will year after year, they become weak and patchy.

Aubrietia.—Of this there are a good many varieties, differing more or less in the size of the flowers, but all beautiful and very profuse-flowering plants. Purple is the universal colour, in one shade or another. They are excellent town-garden plants, and are among the very best for spring-bedding, being very hardy, and yielding a long succession of flowers during the months of March, April, and May.

Cheiranthus alpinus and **C. Marshallii** are the gems of this family, as regards their beauty and neatness of habit. The latter is the strongest flower of the two, rising to the height of about 9 inches; while the former, a little less in height, is also less effective and warm in colour, being pale yellow—the latter golden or orange yellow.

Iberis.—There are five or six species of this genus well worth growing where spring flowers are in demand. They are not the earliest to flower, yet some of them open their flowers in April, and continue to display them for a couple of months. The best are *I. corifolia*, a very dwarf and compact one, growing about 6 inches high; *I. Garrexi*, about 9 inches high; and *I. gibraltarica*, about the same height as the

last. All are white flowered. The two first named begin to flower in April, the last in May.

Viola odorata.—In a selection of this kind the universal favourite cannot be omitted; for although not of any use for the mere decoration of the flower-garden, it is indispensable among spring flowers on account of its delicious fragrance. There are numerous varieties, but the *Czar*, the *Giant*, and *Queen Victoria*, being larger flowered than most of the others, are best worth growing: their flower-stalks are stout and long in proportion to their flowers, and therefore so much better for cutting and making up when cut.

Orobus vernus.—A very beautiful plant, growing to the height of about 1 foot, compact and neat. The flowers are bright purple-red, and very profuse, appearing in April and May.

Oxytropis uralensis.—A very neat and compact plant, with pretty, silky, grey leaves, growing only a few inches high, and bearing numerous racemes of bright purple flowers in May.

Saxifraga crassifolia.—A rather large and coarse-leaved plant, but very free-flowering; and as the flowers last well when cut, it is well worth growing where cut flowers are in demand in spring. *S. hypnoides*: one of the mossy section of this valuable genus, closely carpeting the ground with bright verdure throughout the year, and clothing itself with bright, large white flowers during April and May. *S. oppositifolia*: this is one of the prettiest, as it is one of the earliest, of spring flowers. The flowers are large, bright rosy-purple, and there is a fine white companion variety, both of which should be in every garden where spring flowers are desired. In early seasons the flowers open in February, but more generally in March, and last well through April.

Aster alpinus.—A very neat growing plant of about 9 inches in height, with large purplish-blue flowers, which, along with its white-flowered variety, should be in every garden. It begins to bloom in May, and lasts for several months.

Daisies, in all their variety and profusion of flower, cannot be omitted from a list of spring flowers of the most ornamental character; they are indispensable to the spring-flower gardener.

Doronicum caucasicum.—A very gay plant, with large, bright yellow flowers, growing about 9 inches high, which open in May, and continue for about six weeks.

Erica carnea.—One of the earliest and best of this fine family, growing only a few inches high. It may often be seen in flower in early winter in mild seasons; and if the weather is favourable, it continues to flower till June. The flowers are rose, purplish, or white, according to the particular variety, of which there are several. *E. australis* and *E. mediterranea* are early-flowering sorts which are also valuable in the spring months.

Vinca major and **V. minor** are very pretty and free-blooming plants

for rockwork, and for the front lines of shrubbery borders. They open their flowers in April and May.

Gentiana acaulis.—The *Gentianella* is a very familiar plant to most readers, and is one of the most beautiful of spring flowers. *G. verna*, with its flowers appearing in April, is one of the choicest gems of spring. It is a tiny plant, by no means easy to cultivate, except in deep, cool, moist, rich loam ; but wherever it will succeed, it should have a place. The flowers are a deep gentian blue.

Phlox canadensis.—This grows to the height of about 1 foot. The flowers are purplish-lilac, in compact panicles : they are very profuse, and open in April and May. *P. frondosa* is a neat, compact, trailing plant with pink-coloured flowers. *P. reptans* flowers in April and May, the flowers being large, numerous, and reddish-purple. *P. setacea* is a pale pink-flowered sort, the flowers of which appear about the same time as the above ; and there is a pretty white-flowered variety of it named *nivalis*. *P. subulata*, also with pink flowers, and *P. Nelsonii*, a very fine white-flowered sort, are also valuable spring flowers.

Myosotis dissitiflora and **M. sylvatica** are beautiful spring-flowering Forget-me-nots which are largely used in spring-bedding, and which are indispensable.

Omphalodes verna—having the flowers of a Forget-me-not both in regard of form and colour, but quite distinct leaves and habit of growth—is very beautiful throughout March and April.

Physochlaina grandiflora and **P. orientalis**—the former with pale yellow, the latter with deep purple flowers—are both excellent plants, growing about 1 foot high. Both flower in April and May.

WM. SUTHERLAND.

CRAIGLEITH NURSERY, EDINBURGH.



NOTES ON DECORATIVE GREENHOUSE PLANTS.

THE FUCHSIA.

THE Fuchsia, like the Pelargonium, may be called everybody's flower. Cottagers of every degree who have any love for flowers always endeavour to have a Fuchsia or two. We have seen them in cottagers' windows grown in all kinds of substitutes for flower-pots—old tea-pots, jam-pots, jugs, and preserved-meat tins. Sometimes the growers were rewarded with a few flowers, but very often had to be content with a few sickly-looking leaves. On the other hand, we have seen specimens grown and flowered in cottage windows that would have done no discredit to gardeners having every means of growing them at their command. Unless large specimen plants are wanted, it is not desirable to retain many old plants over the winter, at least for the

purpose of greenhouse decoration; but many gardeners retain the whole of their old plants, and find accommodation for them in the flower-garden the following season, where they generally make a very effective display for centres of beds, or dotted along ribbon-borders.

A plant or two of each variety should be introduced into heat early in January, from which to get a stock of cuttings. As soon as the young shoots have attained to a sufficient size the cuttings may be taken off. Have some pots ready prepared, well drained, three-parts filled up with soil, and the remainder with sharp sand. The pots may be either of a size suitable for each variety, or large enough to contain two or more varieties, keeping them carefully labelled. Water them after being inserted, and plunge the pots up to the rim in a hotbed or propagating-pit. In about a fortnight they will be nicely rooted, and ready for potting off. They should be potted singly in 3-inch pots, using good fibry loam, leaf-mould, and a good sprinkling of sand to keep it open. One piece of crock over the hole will be sufficient for pots of this size. When potted, return them to the warm pit, hotbed, or vinery, where they may enjoy a temperature of 65° or so. It may be necessary to shade them slightly for a few days at first until they begin to root in the new soil. And now the mode of training must be decided upon. If they are wanted for pyramids or standards, the leader must be encouraged, and kept tied up to a stake. If intended for a standard, the side shoots may be rubbed off as they appear, until the desired height be attained, when the point may be pinched out, and the formation of the head begun. If, on the other hand, pyramids be aimed at, the leader must also be kept staked up and side shoots encouraged, pinching the points occasionally to induce a bushy habit. Some of them however should be grown as dwarfs, and these should have the leader pinched when about 6 inches high, and the lateral shoots also as they require it.

They must be shifted into larger pots when the roots penetrate through the ball and reach the sides of the pot: 6-inch pots may be used for this shift, or a few of the stronger plants may be put into 8-inch pots. The compost for this shift may be of a rougher nature, and have the addition of some well-rotted dung mixed with it, as also a layer over the crocks. In potting, ram the soil moderately firm round about the ball. If potted loosely they never thrive well; the soil acts like a sponge in retaining too much water, which soon sours it. The plants must still be kept in heat, and unless wanted to bloom early, the flowers should be picked off as they appear. If large plants are wanted, they must be encouraged by further shifting into larger pots, and by August good large specimens may be grown.

A batch of cuttings may be put in six weeks or so later, to grow on for later flowering, and treated in all respects like the others. About the month of June they may be put into a cooler house, or even into cold pits, but kept away from cold draughts.

The old plants will come in nicely for early flowering, if after the cuttings are taken off they be partially shaken out and repotted into fresh soil, and will come in very useful in April or May, when the spring bulbs are past. The following list of a dozen varieties may be pretty well relied on as satisfactory, viz.—Admiration, Avalanche, Coma, Mrs Ballantyne, Arabella, Princess Beatrice, Marksman, Lord Beaconsfield, Noblesse, Commander, Rose of Castile, Starlight.

J. G. W.



HARDY FRUITS.

THE present month is generally a period of much anxiety among fruit-growers, especially to those who make it a business and who in a great measure depend on the crops for their living. In this vast fruit-growing district it is a matter of great moment to have a fine fruit-crop. The present season, being a month later than what we have experienced for some years past, gives a substantial hope of abundance; and it is hardly possible that the trees could be heavier loaded with fruit-buds; but such promise is not very desirable with trees which are weakly and exhausted; a heavy clothing of blossom often meaning a great portion of the embryo fruit perishing. The finely-ripened wood and lateness are, however, much in favour of plenty. Where trees are under careful manipulation as regards thinning, their chances are two to one against the slovenly matted system not uncommon with the “penny-wise” cultivators. We have had some favourable opportunities of noticing what may be expected from the tree this year. Taking a ride southward through the Evesham district, and some others, where fruit and vegetable growing are on an extensive scale, the former could not look more promising, while the latter never looked more wretched; and the cold easterly winds and falling snow as at present (April 12th) do not give “sweet solace” to market-growers of vegetables. With ourselves there is not much to complain of, beyond the loss of about 2000 Broccolis and the extreme lateness of growth. Frost about 6° to 7° each night at present, I fear, will cripple the Pear buds, especially those kinds which open early. Trees on walls may be protected in a measure, but standards, pyramids, and bushes in the open gardens and orchards can have little done for them.

During May there is such a pressure of work in gardens, that the disbudding of trees and general attention they require are overlooked and postponed. To be successful with fruits (as indeed with most other cultural matters), the adage, “delays are dangerous,” must have

full consideration, especially where insects take up their summer quarters. These pests should have "prevention" in practice against them previous to the fruit-buds opening. The wall trees, or trees in orchards, &c., if they can be managed so, may be gone over with a liquid, such as Gishurst's compound, which is known to be destructive to them, and which should be syringed lightly over the surfaces. Walls that have long been subject to the barbarous method of "nailing" and "unnailing" are always good retreats for insect life, and they ought to have extra attention in keeping vermin from increasing in them. Soft soap (about half-a-pound or so to a gallon of water), with a quantity of tobacco juice to well colour it, will keep them in check, but it must be used as a "preventive," as, when the black or green aphids get into the developing foliage, they are soon shielded from all washes and liquid poisons, and remain curled up in the leaves till their work of destruction is completed. Newly-planted trees should be secure against wind and drought. Mulching, if not attended to before, should be done without delay. Watering may be necessary on dry sandy soils and in dry positions, but the practice is not to be put in force when it can be avoided. Pond water, or that which has been exposed to sun and air, should be used when it can be had. For appearance' sake a little clean soil may be thrown over mulching, leaving the surface somewhat flat to receive rain.

Disbudding may now require careful attention. The system of doing it all at once and "done with it" is worse than not doing it at all, especially if the weather should be warm during the day and followed by frost or cold winds at night: fruit and trees suffer alike under such barbarous treatment. Apples, as dwarfs or espaliers, may be gone over, and any shoots taking the lead, at same time robbing other parts of the tree, may be nipped back or rubbed off. The newly-planted trees are better in every way when their growths are regulated in summer and the future main shoots decided on. Quantity of shoots is not the point to be aimed at, but those well placed at equal distances from each other, and plenty of room to develop the foliage and allow the fruits to have sun and air. To have finely-trained espalier Apples the shoots should be trained as they grow, securing those best placed, keeping them straight and equal in distance from each other. The same applies to Pears; those on walls require very frequent attention. If the lower buds are suffering from the advantage taken by the "leaders," the latter ought to be stopped so that the former may improve themselves. Branches trained too thickly, spurs allowed to become matted and densely crowded, are common evils among Pears, and the trees thus cast their fruit-buds or refuse to swell fruit if they should set. Apricots will now be swelling where they have set freely, and careful disbudding of the trees is necessary, so that the fruit may not be unduly exposed to the inclemency of the weather. Much severe frost, hail, and cold rains may be experienced during May. Commence by rubbing off

the shoots growing straight from the tree, and stopping those which are taking too much of the lead. Apricots are very impatient of the knife, and should have little pruning left to be performed during winter. This and a thoroughly firm soil composed largely of lime are two items very conducive to keeping Apricot trees in health; late ripening of wood and much winter cutting are evils which strongly lead to canker taking place with these trees. Cherries are best treated on the spur system; they can be trained into any form, but, like Apricots, they must have the greater part of the necessary pruning done during the growing season. Morello Cherries are best when much left to themselves, kept carefully from crowding, and the knife used only as a necessary evil. Peaches and Nectarines must be disbudded with much caution, as the present crop as well as the future health of the tree may be much impaired by wholesale stripping. The trees and crop are by no means safe from severe weather—sharp weather may yet be expected—the foliage is nature's covering, and it is quite necessary that it should not be unduly removed. First remove any out-growing shoots clean from the trees, looking carefully for any leaders which may be robbing the tree; stop them before they grow much—this will speedily equalise the growth, without checking the trees; choose the shoots which are to form the bearing wood of next year; they should be from the base of the old shoots, and closely laid in. When they are tied straight and neatly now they are more easily managed at the winter pruning. A little done often to the trees is conducive to success, and one who is experienced in the work can go over a great space in one day.

Figs now being uncovered and tied to their places will show what fruit they are likely to produce. The greatest evil we see with respect to these in three-fourths of cases is the persistence in crowding them to the walls; some may be seen plaited and twisted like hedges. Where such is in practice it is no wonder that thin crops on the ends of some shoots which have been liberated are the only *fruit* seen in five seasons out of six. Whether Figs are spurred, or an annual replacing of wood is the system on which they are grown, signifies little, but it is certain that in either case they will not succeed when crowded on the walls. A neighbour who grows immense quantities in orchard-houses prunes annually as he does his Black Currants, leaving the trees open in centres, and otherwise well thinned. The quantity of Figs which this cultivator gets annually on walls is enormous; and it is there, especially under glass, that the finest Figs in the country are had. We prefer the practice between spurs and young wood annually laid in and cut out, but indeed these shoots are so short and stiff that they are little else than spurs, and always bear abundantly. All should be kept close to the wall, neat and orderly, and when at any time the trees take to growing excessively, careful examination of the roots will show that some are going down into colder soil. These may be removed and

a mixture of bones, brick-rubbish, and soil rammed firmly underneath the roots ; fibre will then be plentiful, and there will be no fear of plenty of fruit. If shoots start freely into growth and no fruit attached to their base, they may be rubbed off to let them break further back, and some dormant buds may push fruit. It is always of importance to keep the trees close to the walls when they are planted, with the view of being benefited by the bricks and mortar. In some warm southern districts Figs are treated more like orchard trees, and allowed to grow as they like. We have seen this answer well in Sussex and in the Isle of Wight, but it would be folly to try it in northern districts. In gardens this has a slovenly appearance. Stopping of Figs induces fruitfulness : the top pressed at every fourth leaf gives sturdy fruit-bearing wood.

Currants and Gooseberries may require stopping of leading shoots. Though these are generally left to themselves, a little care, especially with young vigorous bushes, amply repays the little labour expended. The centres thinned out a little to shape the bushes, and leaders prevented from robbing the other portions of the bushes, are their chief wants in summer pruning. The same applies to those against fences. Caterpillar may be seen on Gooseberries, and should be either hand-picked or dusted with white Hellebore powder while the bushes are damp : the powder mixed with water and syringed over the bushes answers well. Strawberries may be planted from the stock which have been forced, or from the store beds. The plants made firm at root and well watered will give little trouble afterwards.

In the orchard house, stopping and thinning of shoots, gradual thinning of fruit, careful watering and syringing, increasing the supply of air as the season gets warmer, fumigating and dusting with tobacco powder to prevent insects establishing themselves, are the chief wants in this department.

M. T.



ASTILBE JAPONICA.

(HOTEIA.)

No gardener who has a demand for decorative plants and cut-flowers throughout the early spring months should be without a good stock of this hardy plant. It is so easily forced, flowers so freely, and the blooms stand so long, either when cut or on the plant, that it is simply invaluable. When a large stock of it is at command, a few plants should be introduced to a warm house, such as a vinery, when forcing commences, and small batches should be introduced in succession, as occasion requires, from January onwards. They luxuriate in a warm, moist atmosphere, with a plentiful supply of water at the roots ; indeed it is scarcely possible to injure them with too much water, when growth is fairly started ; it is, therefore, good practice to keep the pots stand-

ing in saucers or "flats" full of water, giving them weak liquid every alternate watering. Directly the majority of the spikes begin to open their lowermost flowers, the plants should be removed to a cooler and more airy house—they will thereby be better prepared for the dry air of the sitting-rooms, &c., for which they are so extremely well adapted. When the season is well advanced, the late batches will come on quite well in the greenhouse with sun-heat.

As soon as the earliest batches have finished flowering, they should be grown on in a warm house till about the end of May, when they can be gradually hardened off and planted out in the open border, or shifted into larger-sized pots, and plunged, choosing a warm, sunny position, so that the plants can have all the sun available for the maturing of the crowns. The stock can be increased when desired, by breaking up the largest plants into small bits, and planting them out in rich soil composed of loam and dung in equal parts, in rows 2 feet apart and 18 inches in the row; those in pots should also be plunged in the same compost, and liberally supplied with water, with a little guano or other good fertiliser mixed with it, when dry weather prevails.

As soon as the foliage decays in the autumn, the requisite number of plants should be lifted and potted, and placed in the orchard-house or cold frame—in fact, any outhouse will do where they can be kept cool, moist, and free from frost, so that the plants can be got at when wanted for the forcing-house. Some gardeners are in the habit of potting them as required, but we prefer to get them all under cover in the autumn, about the month of October; and at this potting it is necessary to reduce the balls of those plants which are not in pots, so that pretty large crowns can be easily got into such as 5 or 6 inch pots, which we find most useful for general purposes.

DUNDONIA.



THE GARDENER'S PRIMER.

NO. II.

ALL plants may be said to have had a natural habitat originally determined for them at the different geological epochs of time at which vegetation in some form or other may be supposed to have commenced, but the secondary causes which now determine the habitat of plants may be briefly stated to be: The chemical nature of the soil in which they are found—some plants delight in siliceous soil; others in calcareous, or limestone, or gypseous soils; other plants again prefer a soil impregnated with sea-salt; others gravel or clay soil; others prefer to grow in the cracks of granite rocks; and other plants appear more accommodating than any of these in their requirements, and seem to follow man to minister to his comfort or his luxury, and are

indiscriminately found in any of these soils, especially if they have been in any way decomposed or intermixed: The elevation of land above the level of the sea, and, within certain limits, the latitude of the countries in which they are found, where the daily average annual amount of sun-heat during the season of growth of plants is above the degree of heat necessary first to start them into growth, and sufficient to enable them to complete their full growth, and which in the case of annual plants must necessarily be above freezing-point, or they could not germinate: The relative situation of islands to continents or mainland: The presence of vast tracts of land covered with fresh or salt water, and the currents in the latter: The state of the atmosphere, its dryness or moisture, its currents of wind, its chemical composition—some plants delight in an atmosphere charged with chloride of sodium or sea-salt which would be destroyed by an application of such salt to their roots: The amount of sunlight, often as important as sun-heat, and, in fact, as we approach the poles, replacing its want: The power of the chemical or actinic rays of the sun: The inherent vital power in the plant itself to resist destructive agencies. Upon some or other of the above or similar secondary causes, with here and there anomalous exceptions, the habitat of plants may be said to depend.

We must now proceed to the main part of our subject—the plant—and try to elucidate some of its characteristics.

Each plant is an aggregation of cells; each cell consists of a little transparent spherical sac or globe; the outer membrane enclosing it is made of cellulose, which, by the by, is insoluble in water, containing in it liquid or viscid granular matter, sometimes called the primordial utricle, or protoplasm, made of carbon, oxygen, hydrogen, and nitrogen, and some sulphur and phosphorus; and within the protoplasm is a nucleus. These cells grow either by internal or external growth, or by division of the cell into two cells (by plant growth is meant either formation of new cells, or increase of cells already made, or thickening of cell walls). Each cell nourishes another cell; and where there is no pressure the spherical or globe shape will remain; but where there is pressure this appearance is soon lost sight of, and it then assumes various forms and shapes, and is called cellular tissue. The outer covering of all plants is called the epidermis, and is in reality cellular tissue. As a consequence of cell growth, each plant has the power of reparation of injuries done to it.

For convenience of classification, each plant will be found to belong to some collection of plants called a species, supposed to have had, in monœcious plants, a common ancestor, or in diœcious plants, a pair of ancestors; and each species will belong to a group of one or

more species called a genus (or genera, in plural), and each genus not less permanent or distinct than the different species included in it.

Each genus, in like manner, will be found to have been grouped with other genera, and then placed in a family, as a natural order is called; and each family in its turn will again have to be arranged into one or other of the following four great classes: *First*, Dicotyledonous plants—that is, plants whose seed is furnished with two cotyledons, or seed-lobes: by far the larger number of species of flowering-plants belong to families of this class, and from the structure of their stems they are also called Exogenous. *Second*, Monocotyledonous plants—that is, plants whose seed is furnished with only one cotyledon, or at least only one is apparent, and from the structure of their stems they are called Endogenous. *Third*, Polycotyledonous plants, with three or more cotyledons, of which the family of Coniferae or Fir tribe and Palms are good examples; and, *Fourth*, Acotyledonous plants—that is, plants whose seeds or spores have no cotyledons, of which Ferns, Mosses, and Fungi are good examples, and from the structure of their stems they are called Acrogenous. Our remarks are applicable for the most part only to plants belonging to the first and second of these great classes.

Each plant is named with its generic and specific name, generally in Latin or Greek. Many of the specific names have been chosen according to the characters of parts of the plant, such as the leaf, as *serrata*, *dentata*, *salicifolia*; or according to their local situations or habitat, such as, *arvense*, *pratense*, *nemorosum*, *sylvaticum*, *aquatica*, *rupestre*, or *nivalis*; or according to the uses or attributes of the plant, such as *somniferum*; or according to its time of flowering, as *vernum*, *aestivum*, or *autumnalis*.

The origin of species has recently been the subject of much controversy, and much time and labour expended to prove that the characteristics of species are not of such permanent nature as to be entitled to be regarded as the landmarks in plant classification they have hitherto been. However this may be, it will be well to bear in mind that whatever may be the final result of these inquiries, and which really do no harm, it will be always necessary to make use of specific descriptions of the characteristics of plants in order to render them intelligible, and to arrive at accurate views of Geographic Botany.

Each plant has, for the purpose of holding it in its place, and for obtaining nourishment and for storing it up sometimes, as in biennial plants, a root or descending axis, or earth end, or alkali extremity, formed at the end of the embryo, but in connection or continuation with the stem, and from which numerous root-fibres, covered with fine hair-like roots—in reality elongations of cells in the

epidermis or outer covering of the root-fibre. Each plant, in like manner, has a stem or ascending axis in connection or continuation with the root, the plumule (of which more hereafter), elongated, with leaves and buds on it, sometimes called the air end, or stem fabric of the plant. Where the root ends and the stem begins in the full-grown plant, or in the seed after germination where the radicle ends and the plumule begins, there is situate what is called the neck (*collum*, in Latin), by gardeners "the collar." It is a guide in planting trees by which the danger may be avoided either of planting too deeply beneath the surface of the soil, and which would therefore be burying part of the stem, or of leaving it too much exposed above the surface, so that the cold of winter might injure and destroy the plant; it is a very sensitive part, and easily injured by the spade or by the foot in the operation of treading.

Each plant, not a monocotyledonous one, at its earliest growth, will have a simple root, called a tap-root, from which other rootlets, called root-fibres, branch off; the length of this tap-root depends on the physical nature of the soil and its resistance to downward growth. In seedling fruit-trees in their early life it should be cut off to encourage root-fibres, so that they may be more easily transplanted, and be encouraged to produce their roots nearer the surface of the ground, where they will be more accessible to the sun's rays and the gardener's spade than they would be if buried deeply beneath the surface of the soil.

The following are some of the different forms of roots: the tap-root, as in Carrot; the fusiform root, as in Radish; the napiform root, as in Turnip; the fibrous root, as in grasses, or in plants of simple annual growth; the tubercular root, or tubercles, as in Orchis; the annulated or ringed root; the nodulose root (Dropwort), or the fasciculated tuber, as in Dahlia; and branched roots which become woody, such as in roots of trees and shrubs.



DOUBLE PRIMULA SINENSIS.

ALTHOUGH some of the older varieties of double Chinese Primulas, notably the old white, are common enough, they, with few exceptions, seldom receive that amount of attention and good culture that their intrinsic worth merits. In too many greenhouses and other places at the present time, are they to be seen dragging out their existence, sometimes undisturbed in the same pot for years; while their more showy but really less valuable relations, the single varieties, receive the best of treatment. Even the old double varieties when well grown, not only form very attractive plants, but are also more serviceable

for decorative purposes than are the singles ; of late years, however, much attention has been paid to their improvement, and the result is a great increase in their number—all more or less superior. Mr R. Gilbert has been particularly successful in this work, and has received certificates for several of his varieties from the Royal Horticultural Society. The whole stock of them has passed into the hands of the Messrs Osborn & Sons, Fulham Nurseries, London, by whom they will shortly be distributed. I saw them as grown and exhibited by Mr Gilbert, also growing and flowering in the above Nurseries, and in both instances was much struck with the very marked improvement effected, both with regard to the size and beauty of the trusses and blooms, and also in their evident robustness. The best white-flowering variety among them is the White Lady ; and the Princess, white, slightly blotched with red ; Marchioness of Exeter, white, spotted with pink (a fine flower) ; Mrs A. F. Barron, blush, slightly striped with red ; and the Earl of Beaconsfield, a good crimson,—are all really sterling novelties.

Double Primulas are decidedly the most serviceable as cut-blooms, as they travel well. Individual blooms are largely used in bouquets, &c., but do not, I am bound to admit, always keep quite so fresh as one would wish ; but from what I have seen of the newer varieties, they, in all probability, will keep better—the flowers being of a greater substance. The plants are propagated by division soon after blooming time ; the offshoots with a heel attached being placed singly into small 60-pots, steadied—that is, lightly tied to small stakes, and placed in a moderately brisk, but not too moist temperature, till rooted. The soil used is about equal parts of fibry loam, and either peat or leaf-mould, with a good addition of silver sand and charcoal. When repotting, less peat or leaf-mould may be used, and a little thoroughly-rotten dung substituted. A good place to grow them in is on the back shelf of a stove, as they require heat till well established ; after which, the temperature of an intermediate house is the most suitable for maturing their growth and afterwards for properly developing the bloom. Avoid large shifts when potting, and use clean and well-drained pots—the 5-inch is a very serviceable size. Many off-sets rot in the striking-pots from being put in too deep ; and deep potting, deficient drainage, and careless watering, kills many that have survived that critical period. Doubtless they are sometimes well grown in cold frames, &c., treated similar to the single varieties, but more often not ; and possibly for this reason are discarded, as being either too difficult or else not worth the trouble to grow. Where the cool treatment has failed, try what a little heat will do.

W. IGGULDEN.

THE AMATEUR'S GARDEN.

CELERY AND SALADS GENERALLY.

Celery.—*Preparing the Trenches*.—To grow Celery to perfection, rich soil is essential. Indeed Celery grows best in decayed manure, a year old or so. It is generally grown in trenches or beds sunk below the surface, by taking out the soil and building it neatly on either side of the trench,—the earth thus stored up to be used for blanching the plants after they have grown sufficiently. It is best to prepare the trenches only a short time before planting; because in spring the frosts cause much of the earth to fall in, and part of the work has to be done over again. Particular care must be taken to beat the earth firmly on either side to prevent its falling back into the trenches again by the action of the weather. Some prefer single trenches; others prefer “beds.” We will describe both methods. Single trenches are made 1 foot 8 inches wide and 1 foot deep. When more trenches than one are required, allow 3 feet between them. In forming them, run the line along each side of the trenches, and cut close down the inside of the line the full depth of the spade. In throwing the earth out, keep it close by the side of the trench. Cut the trench perpendicularly, and slope off the loose earth at an angle of 45° or so, beating it neatly, so that it may keep its place. Do not lay it down to a greater depth than 6 or 8 inches, and make it flat on the top, as it will do for growing small Salads on. The spaces between the trenches are to be piled up with earth in the same way. Break the earth fine, and smooth it over nicely. Lettuce, Radishes, Mustard and Cress, &c., may be sown on the ridges, and they will all be removed before the earth is required for blanching the Celery. After the trenches are dug they will require manuring, and there is nothing better than well-decayed stable-yard manure. Put 6 inches of this in the bottom of the trench, and if the soil be heavy and wet, an inch of sand. But in heavy wet soils it is best to make very shallow trenches and fill them to the brim with a compost of manure and some light soil, or a little sand, if light earth cannot be got. Of course the earth for blanching has to be dug from the sides, but this leaves deep drains, and the Celery is then raised on ridges, which is in its favour in heavy or wet ground. In ordinary soil, after the manure is in the trench, mix it with some of the soil in the bottom of the trench, and leave until planting time. Such trenches, in light dry soils, favour the retention of moisture about the roots of the plants, and moisture they must have or they will not grow satisfactorily, Celery being a native of damp situations. At the same time too much wet, in winter especially, rots it, and hence the reason for planting on the surface on heavy wet soils. The “bed” system of growing is merely an extension of the trench, and is a good enough plan in light dry soils, especially when the crop is to be cleared off early in autumn; but as it presents a wider, flatter surface, the rain is not thrown off as in the trench system, and hence Celery is more liable to rot than in beds. Beds generally contain four rows of Celery, while trenches as a rule contain one, and seldom more than two; and in earthing up those in trenches, if the heads of the Celery are inclined slightly inwards, the earth which is used to blanch them may be built so as to present a thin ridge top, which helps to keep the plants and soil drier than in the case of beds. Frequently only one row is planted in the trench, but we prefer two, as double the quantity is produced with only a little more room, labour, and manure. The chief recommendation which can be given to the bed system is

that greater quantities can be grown in small space; but it often happens that there is room for a trench in small gardens when there is not for a bed; and when the sides are utilised for growing small Salads, not an inch of ground is wasted.

Preparing the Plants.—The best way of raising Celery plants is by means of a slight hot-bed; and should the amateur possess one for striking cuttings and raising half-hardy annuals in March and April, space may be spared for holding a small seed-pan, for a very small space will raise a large number of plants while they are in the seedling state. For soil use one half well-decayed manure, and the other half light loam. Drain well the seed pan or pot in which they are to be sown; use the surface soil in a fine state; sow thinly, and cover very lightly. A piece of brown paper over the pot, &c., will prevent evaporation, but this must be removed the moment the seedlings appear. Keep the pots near the glass, and where they will get fresh air, in order to make them as sturdy as possible. Never allow them to suffer for want of water; and indeed take care that they receive no check, or they may become stunted and useless. When they are in the rough leaf, they must be “pricked out” or transplanted into boxes at from 3 to 4 inches apart, using rich soil, such as we have recommended for sowing. Use the soil in a moist but not wet state; and after they are pricked out, give a gentle watering through a fine rose. Put them back in the frame, and shade slightly for a few days, should the weather be bright and hot. When quantities are grown, the usual and best practice is to put down 3 or 4 inches of well-decayed manure on a hard bottom, covering it with 2 inches of light soil, and to prick out the plants on this, and, if possible, covering them with glass lights until they are strong enough for the trenches or beds. When this takes place, the plants move with nice balls of the rotten manure, and receive but a very slight check, scarcely a root being sacrificed. But in most cases those for whom we write do not require such quantities as would necessitate the use of a whole light. Moreover, the plants come out of ordinary cutting-boxes almost as safely as from a bed or frame. Those who have nothing beyond a greenhouse or a cold frame can raise the plants in these, or even under a common hand-glass in a sunny sheltered place out of doors; but plants raised by these means will be later, and the produce scarcely so good, although with good management in favoured localities very fine Celery is raised without the aid of glass at all.

Planting out.—In planting out choose a dull, showery time, if possible; otherwise do it in the evening, and shade during the day until the plants have fairly started, always watering liberally. Lift and plant the plants with a trowel, and if planted two rows in a trench, place them thus a foot apart. In watering them during summer, give occasional doses of manure-water, made with guano, at about the rate of half an ounce to the gallon of water, or stable-drainings diluted with five times its bulk of water, or well-diluted sewage, &c.; this will aid its progress greatly.

Earthing up or Blanching.—This requires to be done early in autumn, four or five weeks before the Celery is wanted for use; but later in autumn more time is required for blanching. Gardeners who have to make the supply stretch over as great a length of time as possible, raise their first batch early in February, and nurse it on in heat in pots or boxes, and by this means have strong plants put out in May; this is ready for blanching by the end of July, and fit for the table by the end of August. Successional sowings are made and treated in the same way, until the main supply is ready. Amateurs generally grow one lot only, and this is raised from plants sown from the middle of March to

the middle of April. This will require earthing up partially about the middle of September. In doing so, commence by putting a band of matting round each plant to prevent the earth from reaching the centre of the plants. At the same time, clear away any loose or broken outside stalks, and all suckers; break the soil fine with the spade or fork; and work it in round the plants to the depth of 3 or 4 inches. Give a little dusting of lime to the soil—this will keep worms in check—and always choose a dry time for the operation. If they be growing well, another and a final earthing up may be given some time in October. If they are in double rows, incline the heads towards the centre, so that the tops may be in one straight line. Leave as many leaves above the soil as possible, to continue the growth of the plants. Bearing this in mind, build the earth up as highly as possible, and make the trench with a sharp apex, beating the sides quite firm and smooth. This will assist in throwing off heavy rain; and it will be well to see that water has no chance of standing in the side trenches from which the earth has been dug. Five or six weeks after the final earthing up, the Celery will be fit for use. During hard frost protect the trenches with mats, or straw and mats. For flavouring soups, &c., the green tops are generally used; and to have a supply all through the spring for this purpose, make a sowing out of doors in May, and transplant in the same way as Lettuce on moderately rich soil—too rich soil causes it to grow rank, and less able to stand severe weather. After it is transplanted it requires nothing in the way of cultivation except water when necessary, and to be kept free from weeds. In winter part of it may be protected with mats or straw, so that it may be easily got when wanted during a storm.

GARDENER.



HEATING BY HOT WATER.

I HAVE read with very great attention the article upon "Heating by Hot Water," in the February No. of 'The Gardener.' If any one could invent or discover a method by which the necessity for deep stokeholes could be avoided, he would unquestionably do a service of immense importance to horticulturists and others. But I fear we must look for this somewhere else than in Mr Hammond's paper, which only brings forward the ghost of an "old friend with a new face." I do not know whether Mr Hammond is aware of the fact or not, but would he be surprised to find that the method of setting hot-water pipes, recommended by him as apparently something new and untried, has been familiar to gardeners and hot-water engineers for a generation! It is not the case that "engineers and gardeners are agreed upon as being *essential* to a rapid circulation of the water in pipes" that the boiler should be sunk "below the level of both the flow and return pipes," and giving the pipes "a continuous ascent from the top of the boiler to the furthest points of extension in the building or buildings to be heated." This arrangement of the pipes is often carried out, not because it is considered *essential* for the rapid circulation of the water, but because, all things considered, it is, in most cases, the best arrangement for other reasons. I can point to very many apparatus throughout the country where the flow-pipe begins to descend immediately after leaving the boiler, and continues to descend until it enters the bottom of the boiler as a return. But every one who has had experience knows that, although this works fairly well where there is only one, or at most two, houses to heat, it cannot, even were there any advantages to be gained, be carried out in any extensive system. Mr Hammond has

no hesitation in saying that "the circulation of the water in the pipes will be as rapid with the bottom of the boiler one foot below the level of the return pipes as it would be supposing the boiler was sunk several feet deeper." If by this he means that it makes no difference to the circulation whether it is 2 feet or 4 feet from the lowest point where the return enters the boiler to the highest point (whether this highest point is at the far end or immediately above the boiler) of the flow-pipe, then I say, that I have no hesitation in stating that Mr Hammond is labouring under a grievous mistake. Those having practical experience know that, where it is practicable to place the boiler—say 10 or 12 feet below the floor upon which the pipes are laid—there is a very much more rapid circulation than where there is only say 3 feet of difference between the bottom of return and top of flow pipes. This result is what any one acquainted with the motive power at work in a hot-water heating apparatus would expect. Mr Hammond enters into this question; but evidently it is a subject which he has not yet mastered. It seems to me that the "primary reason" he gives "why water circulates or moves in pipes" is just, to put it in plain language, because water is water, a fluid, and not a solid, like iron, stone, lead, or ice. He seems also to be of opinion that one particle of water cannot transmit its heat to an adjoining particle, or, in other words, that water is an *absolute* "non-conductor." This is an error. Water, as well as all fluids and gases, is not a *good* conductor; but it would be a serious mistake for any one to run off with the idea that it has no power to transmit *any* heat by conduction. It is unnecessary to follow Mr Hammond through his explanations of the principles upon which the water circulates, but to show the utter fallacy of the idea that water circulates as rapidly in an apparatus of (say) 4 feet mean height between its lowest and its highest points, as in one with 10 feet, I will quote the formula of one of the greatest living theoretical engineers, Mr Kinneir Clark, of London, who, in his splendid work, 'A Manual of Rules, Tables, and Data for Mechanical Engineers,' page 485, says, when treating of the circulation of hot water, "The velocity of circulation is that of a falling body, due to the difference of height of two columns of water of equal weights of pressure on the base, and it varies on the square foot of the difference of height. The velocity may be found by the aid of Table, No. 85, page 280. The difference of height is proportional to the difference of volumes, Table No. 109; and if the mean height is increased in the same proportion, the increase will be the height from which the velocity is to be calculated. For example: let the mean height be 10 feet, and the difference of average temperatures of the two columns 10° F., say between 170° and 180°. The respective volumes are as 1.0269 and 1.031, and 10 feet $\times \frac{1.031}{1.0269} = 10.04$ feet. Then

10.04 — 10 = .04 feet the difference of height; and the velocity due to this height is 1.61 feet per second, or 96.6 feet per minute. If the height be 20 feet, the difference is .08 feet, for which the velocity due is 136.20 feet per minute. In practice, of course, the velocities due are not attained, nor, at least in the more complex forms, nearly attained. The actual velocities are in some cases not more than a half, or even a ninth, of the velocities due to gravity." This quotation proves conclusively the great value of having depth of stokehole.

And, moreover, when Mr Hammond speaks of his proposal not being applicable where the pipes have to "cross under outside paths," why does he leave out of consideration *inside* paths? Is it not a fact that inside paths make the application of the method proposed impracticable as well as outside paths? And is it not a fact that there are only very few places where there are neither outside nor inside paths to contend with in the way of having to cross under them?

This being the case, of what practical value is all Mr Hammond's specious reasoning about the particles of water rolling and tumbling down the inclined plane, like so many boulders tumbling down the "Cumberland Screes?" The great mistake he falls into is in treating the question as one of pure hydraulics, whereas it should be treated as a question of hydrodynamics. I will only notice one other point, and that is about the back motion of the water in the flow-pipe. He makes a great deal of this; but he is again labouring under a very serious mistake in assuming that this motion goes on until *all* the water in the flow-pipes becomes of equal temperature. Some hot-water engineer seems to have admitted this to Mr Hammond; but it must have been some one who knew very little of what he was talking about. The back-motion in the flow-pipe must immediately cease as soon as the average temperature in the flow-pipe becomes higher than the average temperature in the return. The difference of temperature between the upper part of the flow-pipe and the under part has nothing to do with it, any further than that the upper strata travels faster than the colder under strata. It is well the question should be discussed; but I fear deep stokeholes are a necessary evil, which must be borne with on account of pathways, smoke-flues, and other causes.

A. D. MAKENZIE.

2 GROVE TERRACE, EDINBURGH,
March 15, 1879.

THE PENTSTEMON.

I DO not think the Pentstemon is quite so popular as are some other flowers of the florist class,—at least, in looking round gardens, it is not so conspicuous as it well might be. The fact that this flower is liable to be destroyed in ordinarily severe winters may account for its absence from so many gardens; for although the dibbling in of a sufficient number of cuttings in autumn to keep up stock may appear a simple enough affair on paper, it may become in reality one of the proverbial straws which break the camel's back, and, naturally, this particular straw is not put on. Of course, nurserymen have always plenty of young plants with which to supply customers; but here again the inevitable steps in, and Pentstemons are omitted from the list of cultivated flowers. However, there are sure to be some of Flora's wooers suing for favours with regard to this particular flower, and to such these cultural notes may prove somewhat acceptable. The florist's Pentstemon has been brought to a high state of perfection within the last decade—continental as well as home cultivators contributing to bring about this result—so that the number of really fine kinds is somewhat perplexing in selecting sorts for a collection. I have not found the newer sorts, as a rule, more worthy of cultivation than kinds of older date, and, accordingly, would recommend these latter to be drawn on in forming a collection, adding, of course, kinds of apparently superior merit as occasion may present. A few select varieties pay better in all respects than a large collection of sorts, many of which could be usefully relegated to obscurity. Now as to the various

prominent points in a cultural aspect. The Pentstemon is a free root-producer, and requires a deeply-cultivated and well-enriched soil in which to succeed satisfactorily. When planted, I would recommend a spadeful and a half of rich compost to be placed underneath every plant; this serves as a certain producer of quick and uninterrupted growth from the first—a main factor in the ultimate securing of good spikes of fine bells. The month of April is quite early enough to plant. When started freely into growth, the whole of the “breaks,” with the exception of the main spike and, at most, four side shoots, should be rubbed off. The central spike will of course take the lead, and be much the finest and earliest, but under favourable conditions the side spikes will be comparatively good—more so if the main spike is not allowed to carry seed, but removed as soon as it gets past its best. Providing a stake for each spike at an early stage of growth is very important, as one of the sharp passing gales generally experienced at the time these will be well grown may destroy the harvest of the season’s labour. When cut for exhibition or competing the spikes should be placed with the cut ends in water without any delay, as the flowers and foliage droop past remedying if this precaution is not taken. At local horticultural shows the Pentstemon is commonly shown in wretched plight, merely through want of taking the above simple precaution. Though not hardy enough to stand out of doors through moderately severe winters without being killed, the protection of a cold pit is sufficient to secure safety. September is the month the supply of cuttings for the ensuing season should be taken. Short growths, if healthy, make the best cuttings. These are inserted in boxes in a loamy soil, placed in a cold pit or frame, and kept close until roots are produced. During winter and spring, when the weather is not frosty nor windy nor rainy, the light should be kept off the plants. During frosty weather extra protection should be given them; and if a continuance of frost should cause them to be frozen, the protecting material should not be removed until the plants are thawed. Plants may be lifted and potted in autumn, to furnish cuttings in February, which strike freely in a common dung propagating frame.

R. P. BROTHERSTON.



HINTS ON THE HEATING OF FORCING-HOUSES.

BEFORE the trials of the past winter are forgotten in the warmth and sunshine that may be expected soon, it may not be out of place to make one or two allusions to certain matters in forcing operations, which will have been but too lucidly demonstrated of late, unless where the most complete and perfect appliances for forcing have been at command.

Not since the memorable winters of 1860-61, or 1866-67, have we had anything at all approaching the severity of the past winter, either

in the intensity of the cold or the duration of the storm—to say nothing of the grim fogs, which were so dense in our district as to render it a difficulty at times to discern the difference between day and night. With regard to forcing-houses, and heating apparatus in particular, those who depended or relied upon having such a winter as we have been accustomed to since 1870 must have discovered how unwise it is not to have their knapsack, like the famous Scotch general, “always in marching order.” For ourselves, we discovered, just about the middle of the storm, a leakage in connection with one boiler which heated three small forcing-houses, one of which had been a recent addition. The boiler was not of sufficient capacity before the addition was made, but upon being reset an improvement was effected; and it was only upon its trial for another winter, in order to test its power,—not calculating, of course, upon the severe winter that was coming on.

In another case, where there were two boilers—one of which gave way at the rivets during the early part of the summer, and was not replaced, because its companion was a powerful new boiler, and was calculated to do the work of both,—this was also a cause of interminable watching and dreary suspense, as it was found that the increased pressure upon the boiler was more than it was safely capable of doing; and a breakdown would have been a misfortune, in the most charitable way it can be looked at. Doubtless there have been many similar cases elsewhere, where the opportunity should not be neglected of laying the matter seriously before employers, and explaining the consequences of a breakdown, in order that doubts as to the economy and necessity of introducing such additions to existing arrangements as are required should be removed.

Wherever there is anything like an important charge in forcing, there can be no plea advanced in favour of that economy which assumes to be a saving, to face a winter like the past one either with deficient boiler-power or insufficient heating-surface. The former is dangerous, and the reverse of economical; whilst the latter is neither economical, nor does it afford healthy conditions under which the tender leaves can progress with satisfaction. Another great defect, and one that is most noticeable in the vicinity of large towns, is that detached system of grouping houses, without any notion of condensing, as it were, labour, or of affording means of minimising such material as may be required for the working of them.

Now it would be a matter of comparative simplicity, in the formation of new places, for employers to take the advice, in the first place, of some practical and competent authority, who, whether he had to build one house or six, would not only work upon approved principles, but would also anticipate additions by which heating power could still be supplied from one given point, and would always calculate upon leaving room for further extension, as the situation and other circumstances would suggest.

Houses that stand high, and are exposed to searching winds, should always have an additional pipe ; and no block of forcing-houses should be heated by less than two boilers, which should work either conjointly or independently of each other.

We have had sharp experience lately ; and we would again repeat that such an opportunity should not be overlooked, where it has been found necessary, of laying before employers matters of such vital interest to all concerned ; because, from any point of view, those who have been best equipped with boilers and pipes have saved most in labour and fuel.

PRACTITIONER.



TODEA SUPERBA.

It may not be generally known how easy of cultivation this beautiful Fern is, and how hardy of constitution it is, so that any one who has command of a small one-light cold frame may easily grow it.

A few years ago we got a lot of Tree and other Ferns from New Zealand, and among them was a nice stool of *Todea superba*. Like a great many who have not the proper means of growing them, we set it in one of the houses, where we gave it as much shade as was convenient ; but in large airy houses it was next to impossible to keep it sufficiently moist, so that it never made much progress. We had other two plants for a considerable time before we got this one, and they were in the same condition. Well, two years ago, we put them out into a cold frame, turned the back of the frame to the south, and took out about 18 inches of soil, then put in a good bed of ashes, on which the plants were placed, the fronds being then about 1 foot from the glass. The glass was whitened over, so as to give a nice subdued light. The plants began to show how well they liked the change, and very soon developed into good specimens. We kept them all the winter of 1877-78 in the frame, with no protection except a mat on at night, and though more than once subjected to 14° of frost, they continued to thrive. They have been allowed to remain in the frame ever since, and during the past winter have stood, uninjured, the severe ordeal they had to pass through—having as much as 15° of frost inside the frame, the soil having been frozen so hard for months that the pots in some cases were shattered to pieces. They are now throwing up a nice lot of young fronds, and have not lost one since they were first put into the frame. Another Fern which has stood the winter uninjured beside them, is *Davallia Nova Zealandii* ; as also *Pteris scaberula*, *Hymenophyllum tunbridgense*, and *H. Wilsonii*.

JOHN GARRETT.

WHITTINGHAME.

RAISING VINES FROM EYES ON TURVES.

I AM somewhat surprised at Mr Simpson's comment on the above subject in last month's 'Gardener.' I can assure Mr Simpson that when I penned the article referred to, neither his name nor his plans was amongst my thoughts. I alluded to Mr William Thomson's name for this reason: I took charge of a garden several years ago, in which all the Vines were in such bad condition that I resolved to replace them with young ones. I ordered some Vines from Mr W. Thomson (which, however, he could not supply, so great was the demand for his Vines at the time), and in doing so I asked several questions respecting the course I intended to adopt in renovating the vineries. Mr Thomson was good enough (in his usual kind manner to young gardeners) to write me a long letter of advice and encouragement; and it was to some remarks made in this letter that I referred in my article in last month's 'Gardener.'

I can remember something of a discussion going on in some of the horticultural journals between Mr Simpson and Mr J. Muir, relative to the system of raising Vines from eyes on Turves; and my recollection of that discussion is, that Mr Muir proved the two systems to be entirely distinct. If, however, Mr Simpson's statement is accurate as to what Mr Thomson has written in 'The Gardeners' Chronicle,' I must have fallen into an error, as I do not recollect distinctly the precise terms of Mr Thomson's letter; and as the two systems, as I understand them, may be defined as a "distinction without a difference," I may have infringed *unconsciously* on Mr Simpson's right. I have some knowledge of Mr Thomson's experiments in Vine-growing, being privileged with the confidence of a Dalkeithite in renovating a large range of fruit-houses at a nobleman's place in Scotland; and I think, in consideration of the experience acquired in Vine-culture by Mr Simpson during those "eight eventful years" spent at Dalkeith, of which we heard so much of late, the unconscious error of a writer might have been overlooked.

I have not the opportunity—even if I had the inclination—to refer to any back numbers of the papers referred to at present; but if I am in error, I cordially and willingly tender an apology for the error I have fallen into.

W. HINDS.

[To the best of our recollection, Mr Simpson claimed to have raised Vines on Turves previous to its being so extensively practised by Mr Thomson. But their systems differed, in Mr Thomson having root-pruned the young Vines by cutting off all the large rootlets, so causing a great multiplication of fibry roots. If this version of the systems be correct there is no need for any further discussion on the subject.—ED.]

SCOTTISH HORTICULTURAL ASSOCIATION.

THE first ordinary meeting of the second session was held in the Hall, 5 St Andrew Square, Edinburgh, on the evening of Tuesday the 1st ult.—Mr M. Dunn, president, in the chair. Ten new members having been proposed and seconded, the president proceeded to deliver his opening address. The Association, he remarked, had entered upon the third year of its existence under the most favourable auspices—more than 100 members had been added to the roll during the past year—able and instructive papers had been read at the several meetings—and judging from the printed syllabus which had been circulated among the members, there was no reason to doubt that the meetings during the current year would be quite as interesting as those of the past. A number of schemes for advancing its usefulness were at present under the consideration of the council; one of these, he might mention, was the granting of certificates to exhibitors of articles which, though not really new, showed superior cultural skill. Mr Dunn concluded his address by warmly admonishing young gardeners to diligence in the acquisition of knowledge on all subjects connected with their profession. Mr James Anderson, Uddingston, next read a paper on “The Education of Gardeners,” commencing as a boy at school, where he acquired the elements of education, and from which he could not enter upon his professional career too well furnished with general information. The young gardener, if he would rise to eminence, must cultivate habits of observation, and seek to attain a thorough acquaintance with all the details of practical work in the garden. The bothy also, in which the great majority of gardeners spent the time of their probation, afforded rare opportunities for self-improvement; there, young men interested in the same subject could stimulate and help each other, and join together in procuring books and periodicals on botany and horticulture. Mr Anderson’s paper was listened to with great attention, and after an interesting conversation upon the subject, in which several of the members took part, he was accorded a hearty vote of thanks.

From a considerable array of interesting plants and flowers on the table for exhibition, we noted a fine plant of *Pilea muscosa nana*, a dwarf creeping-stemmed form of the old-fashioned “Artillery plant.” It will doubtless prove useful for surfacing the pots of plants for table decoration, as it has a dense cushion-like habit of growth and is quite as easily grown as the parent. This was sent by Mr Forman, florist, Dalkeith. Mr M’Clure, Trinity Grove, had a seedling stage Auricula, very distinct and pretty, but somewhat deficient in that smoothness and decision of marking regarded by florists as indispensable to first-class flowers of its tribe. Mr Macmillan, Broadmeadows, sent blooms of a grand strain of seedling Cinerarias, all remarkable for their brilliant colours. A well-grown specimen of the white variety of *Primula denticulata*, from Messrs Dickson & Co., was much admired. This is a plant well worthy of cultivation, forming a fine companion to the well-known and popular species. Messrs Methven & Sons had a number of trusses of seedling Rhododendrons, four of which were from the Indian species *Thomsonii* and one from *Falconerii*, another Indian species. Mr Hugh Fraser explained that the former had been obtained from seed saved from hardy varieties, fertilised with pollen from *Thomsonii*. They were very early, flowered freely, of clear bright colours, and though the trusses were not so compact as some of the other hardy varieties already in cultivation, they were easily forced, and would doubtless be great acquisitions for the winter decoration of the conservatory. The other seed-

ling had been raised from *Falconerii*, the flowers of which he had attempted to fertilise with *Catawbiense*, but it so closely resembled some of the varieties of the female parent that it was probable that no cross had been effected, and that it was only a seminal sport. It was announced that a number of new flowers would be submitted to a meeting of the Floral Committee, which was to meet next day.



ROYAL CALEDONIAN HORTICULTURAL SOCIETY'S SPRING SHOW.

AFTER a winter so exceptionally severe, there was every reason to fear that the spring show of this Society would show its effects in a limited entry of exhibition produce. Visitors to the show would therefore be most agreeably surprised to find the Waverley Market furnished with such a grand display of plants and other subjects. It was not, nor could it be expected, such a grand show as that of last year; but it says much for the popularity of the Royal Caledonian, and for the confidence and consequent loyalty of Scotch gardeners to its management, that the show of April 2d and 3d could only be considered as second to its predecessor. As on the occasion of last year's spring show, a row of fir-trees was carried round the greater portion of the large market, just in a line with the front of the galleries and immediately beneath them. The general arrangements were the same as at previous shows held last season—series of tables running the length of the hall, with cross tables at each end. The arrangement is doubtless convenient, but somewhat formal, and will prove monotonous to frequenters of the Edinburgh flower shows if continued in its sameness. Considering the enterprise of the trade in Edinburgh, and the difficulty experienced by some of them in getting their plants staged on the tables allotted to them at the past show, there ought to be no difficulty in obtaining a few naturally arranged groups of plants at these shows.

As is usual with the shows of this Society, all went "merry as a wedding bell," thanks to the good management of the managing committee—Messrs Johnson of the Lawson Co., McLeod of the City Gardens, and Mitchell of Trinity. Nor can we refrain from pointing out, for the benefit of kindred societies, the great liberality shown to gardeners. No fewer than 400 admission tickets were presented to gardeners and their assistants to view the exhibition—an act of liberality on the part of the council unique in the history of horticultural societies. Entering by the west entrance opposite the Scott monument, a table of Hyacinths, staged in competition by gardeners, and containing over 200 plants, at once attracts attention by the general evenness of the lot. Mr Cowe, after several years' rest, exhibits again this season, and again occupies his usual position. The companion table is filled with Tulips, very bright, and some of them especially well grown. The centre line of large tables is, as usual, occupied by nurserymen; that at the west end being filled by Messrs Ireland & Thomson with a collection comprising many fine Palms, new Crotons, and new *Dracænas* in large plants, well-bloomed plants of *Azalea mollis*, several pans of new *Coleus*, some pieces of Orchids, amongst which were a fine variety of *Odontoglossum Cervantessii*, and a good variety of *Dendrobium Wardianum*. On the table of Messrs Dicksons & Co., which came next in order, were grouped large Tree-Ferns, *Rhododendrons*, and forcing shrubs, edged with smaller plants in variety. A small collection of the best Alpines occupied one end of the table, amongst which were several seedling forms of the beautiful *Primula denticulata*. A

Rhododendron of the Edgeworthii type, named Duchess of Connaught, was awarded a first-class certificate. Messrs Downie & Laird came next with a massive group of plants, monster specimens of Rhododendrons—Broughtonia occupying the central position, and supported by splendid examples of brilliant Countess of Haddington, Falconerii, &c. Various Azaleas, a fine *Imantophyllum miniatum* var., which was awarded a certificate, and some of the finest varieties of Cyclamen ever shown in Edinburgh, were the most noteworthy subjects in this grand table. The table next in order is that of Messrs T. Methven & Sons, which is solely filled with a collection of superbly-flowered Rhododendrons; something to have relieved the overpowering mass of flower in this group would have added immensely to its effect as a whole. Some of the best Rhododendrons were John Waterer, Mirabile, Prince Camille de Rohan, the Grand Arab, and Comtesse de Morello. On a smaller table alongside this firm had an excellent display of forced Pelargoniums mixed with other seasonable plants. A seedling Pelargonium, named Countess of Rosebery, in this group, had a certificate awarded to it. Messrs Drummond Brothers had a table of choice decorative plants, with several nice bits of Orchids intermixed. This firm had also some chastely-got-up wreaths and bouquets occupying one end of their table, which was placed across one side of the hall at the east end. Opposite, Mr Wm. Taylor, market-gardener, Hermitage, Lochend, Leith, staged a lot of forced stuff in excellent condition. There was a back row of capital Spiræa, and rows of Polyanthus-Narcissus, Tulips, Hyacinths, a line of Lily of the Valley finishing off the whole. A special award of £3, 3s. was worthily awarded to this group. Mr Robertson Munro was great in Alpines, hardy Primulas, and Narcissus; a certificate was awarded to a white variety of *Primula denticulata*. Messrs Todd & Co. had their table occupied with decorative subjects—plants, bouquets, &c. Mr Anderson, Meadowbank, staged a small group of seedling Amaryllis, which was most effective, and attracted much attention. First-class certificates were awarded to three of the number—to Isaac Anderson-Henry, an orange scarlet flower with white venation; A. B. Stewart, a deep crimson spotted flower; and Angus M'Leod, crimson. Turning up the northern side of the building, a basket of lovely sprays of *Hovea Celsii*, another of *Rhododendron arboreum*, and another of mixed *Camellia* blooms from Mr Knight, Floors, is noted. Here also are the *Deutzias* in large plants, but overtied. A table of exotic Ferns next attracts attention, as containing a remarkably even lot of fine plants, in several species of *Adiantum*, *Davallia bullata*, extra fine, and a good *Gleichenia dicarpa*. Up the same side are the specimen stove and greenhouse plants—the best, as usual, from Mr Paterson, Millbank; Azaleas in small pots and well bloomed; the gardeners' classes for Alpines, Primulas, Cyclamens, &c.,—all well filled and keenly contested. The Roses were not a large competition. Some very fresh buds of *Maréchal Niel* were staged by Mr Pearson, gardener to Lady Dundas, Beechwood; but doubtless the great centre of attraction in this series of tables is that devoted to the Orchids. There is not only a better competition for these than is general at Edinburgh, but some notable plants are shown. *Dendrobium nobile* is shown in several collections, also *D. Wardianum* and *D. densiflorum*, a well-bloomed basket of *Cœlogyne nitida*, a potful of *C. Lemoinei*, and the Arbroath specimen of *Phalænopsis Schilleriana*, with five branched spikes and nearly 400 blooms. This superb plant was awarded the first prize for a single Orchid, 15s. Mr Masson showed some fine cut Orchids as well, including a spike of the new *Cymbidium Lowianum*, and some good varieties of *Lycaste Skinneri*, including an extra fine bloom of *alba*. From Brentham Park, Stirling, came also a collection of cut Orchids; and also from Mr N. M'Gregor, gardener to C. Walker, Esq. Bradfield, Lanark, a large and varied

collection of cut Orchids, in the newest and best varieties, and every one of them bearing the stamp of high cultivation. It was surely through some mistake that no notice was taken of these by the judges. Passing to the south side of the hall, we find the large specimen Azaleas, the first-prize specimens of Mr Paul being simply perfect. There is only one table of plants staged for competition. It was made up of half specimen Heaths and Azaleas, foliage plants, and decorative bulbous plants, &c., in variety, and was very effectively arranged. Mr Spence, gardener to J. Buchanan, Esq., is the exhibitor. There was a large display of cut Camellias, but wanting in size and fulness. Fruit was not a large show. Three good Pines were staged. Strawberries not large but fresh; and Lady Downes and Gros Colman Grapes in good condition. A Strawberry in a pot was awarded a first-class certificate. It was shown by Mr Chisholm, gardener to P. Rintoul, Esq., Bothwell Bank. Vegetables were very limited in quantity; especially noteworthy were some large fresh Brussels Sprouts, shown by Mr G. Potter, Seacliffe, in his collection.

The following are the awards of the judges, who were:—

Messrs James Henderson, Cowden Castle; Wm. Shearer, Yester; Neil Glass, Carsebrook; Henderson, Killinside, Paisley; Dunn, Dalkeith Palace; Lewin, Drumpellier; Whitton, Coltness; Lunt, Ardgowan; Henderson, Castle-Wemyss; Johnstone, Glamis Castle; Kettles, Archerfield; and M'Intyre, the Glen.

GARDENERS AND AMATEURS.

Eighteen Hyacinths, not less than twelve sorts—1, John Cowe; 2, George M'Lure; 3, Alexander Kerr. Nine distinct Hyacinths—1, George Greig; 2, Duncan Kerr; 3, Robert Lawrie. Six distinct Hyacinths—1, James Walker; 2, George Lawrie; 3, A. Henderson. Six distinct Hyacinths (Amateurs)—1, G. M. Robertson; 2, G. L. Brown; 3, George Drummond. Four pots Polyanthus-Narcissus, sorts, pots not exceeding 9 inches—1, James Spence; 2, Thomas M'Donald; 3, J. Pearson. Nine pots Tulips, sorts, pots not exceeding 9 inches—1, A. Paul; 2, G. M'Clure; 3, D. Kerr. Six pots Tulips, sorts, pots not exceeding 9 inches—1, G. Greig; 2, Colin M'Farlane; 3, Robert Johnston. Twelve pots Narcissus, garden sorts—1, W. Gordon. Six Rhododendrons, in pots or tubs, hardy—1, Saml. Gordon; 2, A. Stalker. One specimen Azalea—1, A. Paul, 2, Jno. Paterson; 3, G. Greig. Four Azalea indica, varieties—1, A. Paul; 2, Jno. Paterson. Two Azalea indica, varieties—1, A. Paul; 2, G. Gordon; 3, Joseph M'Cormack. Three Azalea indica, varieties, pots not exceeding 8 inches—1, Jas. Bald; 2, A. Paul; 3, A. Stalker. Six greenhouse or stove plants, in flower, distinct varieties, not more than two Azaleas—1, John Paterson; 2, J. M'Cormack; 3, A. Paul. Three greenhouse or stove plants, in flower, distinct varieties, not more than two Azaleas—A. Stalker. Twelve foliage plants, pots not exceeding 8 inches—1, G. M'Clure; 2, T. M'Donald; 3, G. Gordon. Four foliage plants, excluding Ferns—1, J. M'Cormack; 2, Geo. Gordon. Two foliage plants, excluding Ferns—1, Jno. Paterson; 2, James Spence. Six plants for table decoration, pots not to exceed 6 inches—1, Geo. M'Clure; 2, W. Manson. Table of plants, 30 feet by 5 feet—1, Jas. Spence. Two Dracænas—1, Donald Cameron; 2, J. Spence. Four Palms—1, Jno. Paterson; 2, Geo. Gordon. One Palm—1, Joseph M'Cormack; 2, J. Paterson. Four Orchids—A. Paul. Two Orchids—1, A. Paul; 2, J. Spence. One Orchid—1, A. Manson; 2, Chas. Smith. Six exotic Ferns, sorts—1, Thos. M'Donald; 2, A. Paul. Three exotic Ferns, in pots not exceeding 9 inches—G. H. M'Culloch; 2, T. M'Donald. Three Adiantums, sorts—1, T. M'Donald; 2, G. H. M'Culloch. Three pots or pans Lycopodium—James Corsan. One Tree-Fern, not

less than 3 feet stem—R. Grieve. Two Epacris—John M'Farlane. Four Cape Heaths—1, John Paterson; 2, Joseph M'Cormack. Two *Deutzia gracilis*—1, Gideon Potter; 2, Charles Smith. One *Deutzia gracilis*—1, T. M'Donald; 2, R. Johnston. Two Lilacs—2, George M'Clure. Three *Spiræa japonica*—S. Graham. Four *Cinerarias*, sorts—1, James Spence; 2, W. Bennett; 3, William Kay. Two *Cinerarias*, sorts—1, George Greig; 2, James Corsan. Twelve *Camellia* blooms—1, George Greig; 2, James M'Leod. Six *Camellia* blooms—1, George Greig; 2, James M'Leod. A hand bouquet—1, Thomas Bourman; 2, George M'Clure. A table bouquet—G. M'Clure. Two Standard Mignonette—S. Graham. One Standard Mignonette—Jas. King. Two pots Mignonette—1, S. Graham; 2, Jas. Bald. Three pots or pans *Lily of the Valley*—1, J. Pearson; 2, D. Cameron. Four forced *Roses*, in pots—1, J. Paterson; 2, R. Johnston. Two forced *Roses*, in pots—1, J. Paterson, 2, G. Greig; 3, G. L. Brown. Twenty-four cut *Roses*, not less than twelve sorts—Henry Rintoul. Twelve cut *Roses*, not less than six sorts—Wm. Kay. Twelve cut *Roses*, *Maréchal Niel*—1, J. Pearson; 2, James Gordon. Two double Chinese *Primulas*—1, G. H. M'Culloch; 2, J. Paterson. Two single Chinese *Primulas*—1, Hugh Watson; 2, William Panton. Six hardy *Primulas*—1, Gideon Potter; 2, Alexander Kerr; 3, D. Forrester. Two Stage *Pelargoniums*, in flower—James Gordon. Twelve *Cyclamens*, not less than six varieties—1, W. Manson; 2, G. M'Clure. Six *Cyclamens*, not less than three varieties—1, G. M'Clure; 2, J. Walker. Six *Auriculas*, in flower—1, R. Johnston; 2, James Walker. Twelve *Alpines*, in flower—1, D. Tweedie; 2, G. Potter. Six *Alpines*, in flower—1, G. Potter; 2, D. Forrester. One *Pine-Apple*—1, M. M'Intyre; 2, G. Johnston. Thirty *Strawberries*—1, M. M'Intyre; 2, G. Johnston. Two bunches of *Grapes*, black—1, D. Kemp; 2, G. Greig. Two bunches of *Grapes*, white—1, A. Anderson; 2, G. Greig. Twelve *Apples*, dessert, three sorts, named—R. P. Brotherston. Twelve *Pears*, dessert, three sorts, named—R. P. Brotherston. Two *Cucumbers*—G. Greig. Collection of *Vegetables*, eight sorts—1, G. Potter; 2, Thos. Bowman. Six heaviest stalks *Rhubarb*—1, Wm. Kay; 2, H. M'Kenzie. Six heads *Sea-kale*—1, T. Bowman; 2, Duncan Kerr. Three *Broccoli*—T. Bowman. Six *Leeks*—1, G. Potter; 2, D. Cameron. A pint of *Mushrooms*—1, James Gordon; 2, M. M'Intyre. Three *Cabbages*—1, G. Potter; 2, C. Smith. Twelve *Onions*—1, D. Kemp; 2, G. Young. Twenty-five *Asparagus*—James Gordon. Fifty pods *French Beans*—James Gordon.

NURSERYMEN.

Eighteen distinct *Hyacinths*—Downie & Laird. Twelve *Rhododendrons*, hardy, varieties, in pots or tubs—1, Downie & Laird; 2, Thomas Methven & Sons. Twelve *Rhododendrons*, hardy, varieties, in pots not exceeding 9 inches—Thomas Methven & Sons. Six greenhouse *Rhododendrons*—Downie & Laird. Three greenhouse *Rhododendrons*—1, Downie & Laird; 2, Dicksons & Co. Twelve *Camellia* blooms, six varieties—1, T. Methven & Sons; 2, Downie & Laird. A hand bouquet—1, T. Methven & Sons; 2, Todd & Co. A table bouquet—1, Todd & Co; 2, Downie & Laird. Twelve pots *Cyclamens*—Downie & Laird. Six forced *Roses*, in pots—James Bryson, Helensburgh. Two *Tree-Ferns*, not less than 4 feet stem—Dicksons & Co. Six Stage *Pelargoniums*, in flower—T. Methven & Sons. Four *Palms*—Downie & Laird. Four *Azaleas*—Downie & Laird. Twelve plants, foliage—Downie & Laird. Twelve plants, table decoration, pots not exceeding 6 inches—1, Downie & Laird; 2, James Bryson. Twelve *Coniferae*, in pots or tubs—T. Methven & Sons. Collection of hardy spring flowers, not less than twelve sorts—Robertson Munro.

Calendar.

KITCHEN-GARDEN.

CROPS will now be advancing, and will require constant attention to get the necessary work done at the proper time. Thinning, hoeing, and weeding will keep the labour-power at high pressure. In other departments of gardening so much requires to be executed without delay that it is difficult to keep pace with increasing duties. Artichokes (Globe) should now be examined to ascertain what amount of injury has been done by the late severe winter; and where suckers have grown enough to allow their being taken off for a fresh plantation, well-dug and properly-manured ground should be prepared and planted with them, in rows three feet apart, and as much between the plants. We prefer planting a portion each season, and never allow the old stools to remain many years on the same ground. Asparagus will now be in full bearing, and on properly-drained land good soakings of manure-water may be given: guano and a little salt suit well for this purpose. Beans and Peas may be sown at least twice during the month: stake Peas and mulch them; top Beans to induce them to pod; sow French Beans and Scarlet-runners twice in the month,—they do well in deep rich soil. Beet may now be sown for main crop. Well-broken mellow soil, in which is a dash of sand, gives clean-grown, tender Beet. Very poor and rich soils are to be avoided—tough stringy Beet is useless. More Broccoli may be sown, and the plants which are up in the rows should be thinned and transplanted preparatory to planting out in open ground.

Cabbage, Savoys, Brussels Sprouts, Cauliflower, Kale, Parsley, Leeks, Onions (the last named thickly on poor hard ground for pickling), may all be sown for late planting. When late Potatoes are cleared off ground, it is well to have plenty to fill up the space. When ground becomes vacant in end of summer and during autumn, it should be prepared, sown, and planted without delay. Planting thickly such crops as Kale, Savoys, and Brussels Sprouts makes provision for a good supply of greens during spring; and never were such plantations more

valuable than during the past season. The loss of Broccoli and the wholesale destruction of other crops, by the long severe winter, are lessons which will not be unnoticed. Kale sprouts and young Savoy tops have been of much value to us. The whole of the Cabbage left to sprout were entirely destroyed, and such a loss was the greatest which we sustained, these being in great request, while young Cabbage are not valued in any shape. While raising such crops care should be exercised to prevent the young plants in the seed-beds from being drawn up weakly: the rows should be thinned, taking first the larger ones, allowing the smaller ones to gain strength. Carrots may yet be sown for a main crop. This crop often suffers from grubs and other vermin, and it is well to sow Shorthorn frequently, which will in a measure meet the demand. Lettuce should now be sown in small quantities every week or ten days, they run so quickly to seed. It is well to prepare ground thoroughly for them by giving plenty of rotten manure—especially from a cow-yard. Shady positions are most suitable during summer. The plants may be thinned to 9 inches apart, and the thinnings planted out behind a hedge or fence: they will give a succession. Endive for a chance crop may be sown at end of month. Leeks may be thinned and planted as soon as they are about 6 inches high: extra rich land should be provided for them if fine quality is desired. Potatoes now up and growing may have soil drawn over their tops to ward off frost: if the tops have come up very thickly they may be thinned. The tubers will be larger and of finer quality. Spinach, small Salads, Turnips, and Radishes should be sown every week in small quantities: by this practice there need be no failures. Salsafy, Chicory, and Scorzonera should now be sown and treated like Carrots. Attention to thinning should not be forgotten till it is late enough to do mischief. Carrots, Beet, Parsnips, Onions, Turnips, Spinach, Parsley, will all require speedy attention; better that the crops should be too thin than too thick. There is much mischief

often done by the latter, especially when sowing has been done thickly, an evil the inexperienced are liable to fall into. Rich ground demands a greater width between the crops. Keep the hoe at work wherever it can be used. The pronged hoe in good hands does capital service; but to use so as to pull up young rootlets is an evil to be avoided. To keep weeds down a continued war must be waged against them. Leaving them to get into size and depending on erradicating them is a practice which will always secure abundance of "native plants" in every garden. Among such crops as Seakale, Horse-radish, Rhubarb, and other permanent roots, neglect of weeds is often noticeable; but the cheapest and most effectual way of keeping a garden in order is to go over it frequently from end to end. These roots just named may yet be planted if there should be a scarcity of them. Seakale and Horse-

radish may be planted on deeply-trenched ground and well manured: pieces about 2 or 3 inches long dibbled in answers well; but Horse-radish may be put in deeply and allowed to grow up strongly, then trenched out for use. Rhubarb divided up into nice crowns and well planted will do well this year and form fine roots: mulching is of much value to these roots. Cucumbers and Vegetable-marrows may be planted out about the end of month on their ridges, using turfy loam to start them. Hand-lights, protectors, *cloches*, or frames should be used till the plants are in full growth. They may then be mulched and carefully thinned, and watered with tepid water as they require it. Chillies, Capsicums, Tomatoes, and all tender plants raised in heat, should now be hardened off and planted in favoured positions. Prick out and plant Celery as they are fit.

M. T.

FORCING DEPARTMENT.

Pines.—Succession plants that were shifted into their fruiting-pots in March and early in April will now have commenced to grow freely, and require to be carefully managed to prevent their making a soft, attenuated growth. The nights in May being frequently cold, a considerable amount of fire-heat is necessary to keep the minimum temperature at 65°, and such nights being frequently followed by bright sunny days, the fire-heat should be checked early in the morning and be kept as low as possible through such days; for there is no combination of circumstances worse for Pines than hot pipes, bright sun, and, as a necessary consequence, a maximum amount of ventilation. On mild nights the night temperature may range at 70°, after shutting up early with sun-heat for a time at 85°. Keep the atmosphere moist during sunny days by frequently damping the paths and other vacant spaces. Give a little air when the thermometer rises above 75°, and gradually increase it till noon; and after 3 P.M. decrease it in the same way until the houses or pits are shut up with the temperature already named from sun-heat. Watering must be carefully attended to; and while it is very undesirable to keep the soil too wet, it must not be allowed to

become dry and cling away from the sides of the pots. Give weak guano-water every time they require syringing, always dewing the foliage when the house is shut up. If a very bright time succeed to a time of dull weather, rather shade lightly for a few hours than allow the foliage to get severely browned, but do not continue the shade longer than necessary. Early-started Queens will now be swelling their fruits rapidly towards maturity. Keep them steadily moist at the root, and give plenty of air-moisture, especially when shut up early on the afternoons of bright days, when the heat may be allowed to run up near to 90° for a time. Start the fires in time to prevent the temperature from falling below 75° on mild, and 70° on cold nights. Remove all superfluous suckers if such have been left at the first thinning, leaving just enough to give plants enough for stock. Smooth Cayennes and other late sorts for early autumn supply should show fruit before the middle of the month. As soon as the fruit is discernible in the centres, see that they are moist at the root, and maintain a brisk heat with a moist air. Those shifted late last autumn to form a succession to these will have grown freely the last two months, and if kept cooler, more airy, and slightly

drier for a month, will start in June. Any of them that show signs of growth more than fruiting may be kept very dry for a few weeks, which will predispose them to start along with the others.

Vineries.—Keep ripe Grapes cool with a dry atmosphere. If our former directions regarding mulching and watering inside borders have been carried out, there is not much fear of the soil becoming dry and cracking before the grasses are all cut. Keep a sharp look-out for red-spider, and should its presence be detected, attack it with a sponge and soapy water. As soon as the crop is all cut from pot-Vines, turn them out, thoroughly clean the house or pit, which can either be devoted to Melons or young growing Vines in course of preparation for forcing next season. All vineries where Grapes are swelling off should now be shut up early, causing the thermometer to run up to 85° or 90° for a time, at the same time damping the whole floor of the house. At 6 P.M. put an inch or two—according to the weather—of air on the front. Black Hamburgs should now have no more fire applied than is sufficient to prevent the temperature from falling below 65° at 6 A.M.: Muscats should have 5° more. All advancing will now require constant attention in the way of stopping, tying down, and pricking lateral growths as soon as they appear. Admitting that all Vines should not have their main stems closer than 3½ feet, in stopping the fruit-bearing shoots leave them of sufficient length to cover the whole space without crowding. Indeed, we prefer that the rods be 4 feet apart, and the whole space taken up with foliage. The close pinching system has a debilitating effect on Vines, and they cannot carry heavy well-swelled crops without ample foliage. Thin off superfluous bunches of all certain-setting varieties when the Vines are stopped. Less free setters should not be finally thinned either in bunch or berry until it be seen which bunches have set the best. As a rule, however, it is a waste of energy to allow the berries to grow to the size of Peas before they are thinned. Such varieties as Gros Colman and Duke of Buccleuch should be freely thinned so as to give room for their large berries to swell without being jammed.

Vines planted early in March will now have got a good hold of the border, and may be encouraged with a higher temperature. In training those that are intended for the permanent Vines, and which will be cut down next season, allow them to produce all the foliage that can be trained to the trellis without crowding. Others, intended for bearing next season, and afterwards to be cut out, should have their laterals stopped for the present at the second leaf, and the main rod stopped when half-way up the roof, and afterwards allowed to grow on for a time. All covering of litter and leaves that have been applied to outside borders should be removed, not all at once, but partially about the middle, and wholly at the end of the month; and then let the border be forked up, without, however, disturbing the roots, and put 2 or 3 inches of good manure on. It is a great mistake to suppose that Vines do not require feeding after the fruit is cut in May. The next crop depends much on the foliage being kept healthy as long as possible, and the Vines being fed properly, as long as the foliage continues healthy. Pot-Vines will now be ready to go into their fruiting-pots. In potting them use a good holding maiden loam, some bone-meal, or Standen's manure; place them in a light house, and grow on with a warm, genial atmosphere, giving a good supply of air on all favourable opportunities.

Peaches.—Where Peaches are ripening look over the trees, and if any of the fruits are shaded by the leaves push the latter aside so that sun and air can play freely about each fruit to flavour and colour it properly. Give them more air and less moisture, but take good care that inside borders do not become over dry. The better way is to give a thorough soaking as soon as first signs of the approach of the ripening process appear. If crops that have completed the stoning process be considered too heavy a crop for the trees to properly swell and mature, lose no time in thinning them off: the night temperature for these should now be 65°. Syringe freely every fine day, and shut up early with sun-heat, and pay particular attention to the state of inside borders as regards watering. Older and heavy-bearing trees should be liberally supplied with

dung-water. In tying in the wood of later trees, remove every shoot that is not required to furnish the trees with the requisite amount of young wood for next year's crop. The crowding in of wood in summer, and the cutting of it out at pruning-time, ought to be an obsolete system. Keep a sharp look out for greenfly and red-spider, and get rid of it at once. There is nothing more certain than tobacco smoke for the former, and vigorous syringings for the latter.

Figs.—Early crops will be approaching maturity, and if produced from plants in pots, continue to give them the most generous treatment. With a large spread of foliage and a heavy crop of fruit, the trees will require liberal supplies of manure-water; and if the surface of the pots are occasionally dusted with Standen's manure, it will materially assist them. The minimum night-temperature may range about 65°. Syringe the trees freely every day at shutting-up time until the fruit approach the ripening point, when a drier atmosphere and more air should be given. As soon as the second crop appears at the axils of the leaves they should be thinned to three or four on shoots a foot or 16 inches long. Tie in the young growths on later trees, and pinch the points out of them when they have made seven or eight joints.

Melons.—Attend carefully to the impregnation of female blossoms at mid-day on fine days. Stop the fruit-bearing growths one joint above the fruit. So soon as a full crop is set give the plants a good watering, and when the fruit begins to swell freely syringe the plants when the house or pit is shut up on bright afternoons. The earliest crops will be advancing towards full size, and must not be over-

watered in case the fruit splits, as some varieties are apt to do. It is best to mulch the surface of the bed, and so prevent evaporation and the necessity for frequent waterings. See that the fruit is as much as possible exposed to the sun. The night temperature at 10 P.M. may range to 75° when shut up with sun-heat, allowing it to fall to 70° by morning. Attend to the tying and stopping of succession plants, and plant and sow for August crops.

Cucumbers.—Top-dress with loam and rotten manure, in about equal parts, plants that have been bearing freely for several months. Remove all small and dead fruits; thin out the growths, and keep them warm and moist for some time, and they will soon furnish themselves with young bearing shoots again. Early spring-planted ones will now be in full bearing, and should have generous treatment. Now is a good time to plant more plants for autumn supply. The syringe should be freely used every fine afternoon, and the house shut up so that the heat stands at 90° for a short time.

Strawberries in Pots.—Plants swelling off heavy crops of fruit will now require careful attention in watering, and if standing on shelves will require to be watered twice a-day. But all Strawberries in pits should at this season be set on a cool, damp bottom, if not in pots or saucers filled with rich soil. Red-spider is apt to be troublesome now, and the syringe should be freely used up to the time the fruit begins to colour. Fruit ripened now in airy houses are generally of excellent flavour. All plants that have been forced should be well hardened off and planted out in rich soil for fruiting next year.



Notices to Correspondents.

All business communications and all Advertisements should be addressed to the Publishers, and communications for insertion in 'The Gardener' to David Thomson, Drumlanrig Gardens, Thornhill, Dumfriesshire. It will further oblige if all matter intended for publication, and questions to be replied to, be received by the 14th of the month, and written on *one side* of the paper only. It is also requested that writers forward their name and address, not for publication unless they wish it, but for the sake of that mutual confidence

which should exist between the Editor and those who address him. We decline noticing *any* communication which is not accompanied with name and address of writer.

J. HISCOCKS.—The Alnwick Seedling is a fine late Grape. It will do at the cool end of your Muscat-house.

WILLIAM JAMIESON.—We do not know what you call “the old sugar Pear.” Will it be *Sucrée vert* (green sugar), a dessert Pear that ripens in October—a hardy, vigorous, free-bearing sort?

STOVE.—3, *Adiantum cuneatum*; 4, *Cyperus alternifolius*; 5, *Selaginella Martensii*; 6, *Panicum variegatum*; 7, *Selaginella denticulata*; 8, *Isolepis gracilis*. The other two Ferns we cannot make out from the morsels sent. As to the Begonias, it is impossible to name them. They are *varieties* of the Rex type, of which there are scores very much alike. Besides, your leaves were not nearly fully developed. We cannot tell you how to treat your *Pancratium*, unless you let us know which one it is. *Pancratium fragrans*, for instance, is a stove plant; while *P. illyricum* and *P. maritimum* are hardy herbaceous plants. Nearly the same applies to *Hemerocallis*, some of which are hardy, and some—*H. disticha*, for instance—greenhouse plants. We do not know any plant by the name of *Martiminium*.

W. H. DIVERS.—Your MS. received. It is a verbatim copy of what has already appeared in a contemporary, and we cannot make room for it.

W. FORBES, AUCKLAND, NEW ZEALAND.—Received, with many thanks.

G. F.—It depends on the terms of the schedule. If there is a class for Ferns and another for fine-foliaged plants, we should say the *Adiantum* would not be admitted in the latter class.

RODERICK DHU.—*Godetia Lady Albemarle*; *Collinsia bicolor*; *Nemophila insignis*.

NEW PLANT AND BULB COMPANY.—Owing to a press of matter, we are unable to notice this month.

We have to thank several correspondents, for esteemed contributions which are unavoidably held over.



THE GARDENER

JUNE 1879.



HEATING BY HOT WATER.



THE discussion on the above subject is increasing in force. If it goes on much longer, 'The Gardener' will be in danger of exploding, unless provided with a safety-valve. In the issue for April two of your correspondents bring forward—the one an equalised mixed forcing, the other a push-and-pull theory of circulation; and in the May issue Mr A. D. Makenzie furnishes a strata theory.

The latter gentleman says that my paper in the February issue "only brings forward the ghost of an old friend with a new face," and that the system of fitting up a hot-water apparatus therein advocated "has been familiar to gardeners and hot-water engineers for a generation." Now, I am not going to dispute this. It may be all true, for anything I know to the contrary. I only know that if the method "has been familiar to hot-water engineers for a generation," they have kept the matter to themselves, and, as a rule, carried out a different one. Mr Makenzie disposes of several of the statements contained in my paper by simply calling them grievous and serious mistakes, errors, &c., &c. It is not surprising, however, that he adopted this hurried manner, seeing that he was only dealing with "the ghost of an old friend." Indeed it would be unfair to expect him to examine it minutely. Ghosts, whether of friends or foes, are said to be uncanny; and none of us would like to have more to do with them than we possibly could help. I fancy, however, that unless more logical reasons are furnished for the incorrectness of the statements which I have made in reference to the subject under consideration than those supplied by Mr Makenzie, that "the ghost of an old friend with a new face" will be an apparition of frequent occurrence to hot-water engineers.

If "*it is not the case that*" engineers and gardeners are agreed upon, as being essential to rapid circulation of the water in the pipes, "that the boiler should be sunk" below the level of both flow and return pipes, what does Mr Makenzie mean by the following assertion: "Those having practical experience know that where it is practicable to place the boiler say 10 or 12 feet below the floor on which the pipes are laid, there is a *very much more* rapid circulation than where there is only say 3 feet of difference between the bottom of return and top of flow pipes." It is evident from the latter quotation that Mr Makenzie is agreed that sinking the boiler below the main body of the pipes is *essential* to rapid circulation. And to prove "*conclusively the great value* of having a deep stokehole," as being *essential* to rapid circulation, he quotes Mr Kinnear Clarke's theoretical tables for finding the velocity at which the water circulates in a hot-water apparatus. According to these tables—as given by Mr Makenzie,—by increasing the main height from 10 feet to 20 feet, the water will circulate at an additional speed of 40 feet per minute. Mr Kinnear Clarke, however, adds an important qualification to his theoretical conclusions on this matter by saying, "The velocities due are not attained. The actual velocities are in some cases not more than a half, or *even a ninth*, of the velocities due to gravity." But supposing the velocities due to gravity were attained, it would not prove "*conclusively the great value* of having depth of stokehole." Elevation of the flows could be got without having recourse to Paddy's plan of elevating the roof of his dwelling by sinking the floor. This elevation theory, with the view of increasing the rate of circulation, is based upon the fact that the higher the point from which a body falls vertically, the more rapid is its motion as it nears the earth. Now a fluid of less specific gravity cannot fall through one of greater; and in a properly adjusted heating apparatus each volume of water, from the highest point to the lowest, in the circuit of the pipes, is relatively lighter than the volume below it, and therefore the velocity does not increase on the journey from the highest to the lowest point, like a body falling through space, but is the same at all points of the apparatus; and therefore sinking the bottom of the boiler more than a foot or so below the floor on which the pipes are laid is a mistake, if it is done for the purpose of accelerating the circulation of the water in the apparatus. The proper way of attaining the latter is not by increasing the vertical height between the lowest and highest point of the apparatus, but by increasing the difference between the temperature of the water as it leaves the boiler at the highest point and enters at the lowest; and the way to do this is by causing the water to flow over a larger surface of piping in the houses to be heated.

Then in reference to my objection to giving the flow-pipes a continuous ascent from the top of the boiler to the furthest points to which they extend in the various compartments to be heated, Mr Makenzie says, "This arrangement of the pipes is often carried out, not because it is considered essential for

the rapid circulation of the water, but because, all things considered, it is in most cases the best arrangement for other reasons."

Now local circumstances may necessitate the sinking of the boiler below the level of both flow and return pipes, but there is no reason why the flows on entering the building to be heated should not be carried to their highest point at once, and then commence a descending course. And I maintain that this way of fixing the pipes not only "works fairly well," but that it is the *right* way of fixing them; and that it can be carried out more advantageously in an extensive system than "where there is only one or at most two houses to be heated."

Next, Mr Makenzie says it is an error to suppose that one particle of water cannot transmit heat to an adjoining particle; but he supplies no proof of its being so. In a question of the kind under discussion, assertions are useless, unless backed by some means of proving their correctness, and Mr Makenzie supplies no way by which it can be proved that one particle of water is able to transmit heat to an adjoining particle. All experiments with the view of testing this go to prove that *practically* the particles of which water is composed are unable to transmit heat to each other by conduction.

To prove this in a rough way, take sheets of equal dimensions of the following minerals, that is, "iron, stone, lead, and ice," and hold them one at a time on the palm of the hand in front of a brisk fire: the heat emitted by the fire will be transmitted to the hand by the above minerals in accordance with their respective conducting power, the surface of the ice exposed to the action of the fire will receive as much heat from the latter as the "iron, stone, or lead;" but because of the inability of the particles of water to transmit heat by conduction, the palm of the hand is not warmed, but, on the contrary, is exposed to a temperature at the freezing-point so long as the thinnest film of ice intervenes between it and the source of heat. Yes, "water is water," and for any practical purpose has "no power to transmit *any* heat by conduction." Then about the return current in the flow-pipes, Mr Makenzie admits that it takes place in the first instance, but says, "The back motion in the flow-pipe must immediately cease as soon as the average temperature in the flow-pipe becomes higher than the average temperature in the return." Now, if this were correct, "the back motion" would not continue more than a few minutes after the fire was set agoing below the boiler. As the first volume of heated water that entered the flow would raise the average temperature of the latter above the average temperature of the return, so that back motion would not be worth talking about if it only continued the length of time indicated by Mr Makenzie. It continues, however, and is as constant as the forward motion in all apparatuses that have the flow-pipes laid on a continuous ascent throughout their length. The reason for the continuance of the return current is plain. The point of the apparatus on which the fire acts contains a volume of water of less specific gravity than the lower strata of water in the flow-pipes, and whether we treat the question as one of "pure hydraulics" or as one of "hydrodynamics," it won't alter the fact that water of less specific gravity cannot force that of a greater uphill, and therefore the colder and relatively heavier volumes of water in the under side of the flows will roll back in hotter and relatively lighter volumes in the boiler, "like so many boulders tumbling down the Cumberland Screes," notwithstanding what Mr Makenzie may think to the contrary.

Again, Mr Makenzie says, "The difference of temperature between the upper part of the flow-pipe and the under part has nothing to do with it" (that is, with

the back motion), "any further than that the upper strata travel faster than the colder under strata." Now if the colder under stratum did travel uphill, there is no doubt it would do so at a slower pace than the upper and hotter stratum. But when each stratum reaches the highest point and commences the downhill journey in the return-pipes, how do they behave as regards their respective rates of travelling? Does the upper and hotter stratum travel faster than the under and colder stratum on the descending course? and if not, may I ask Mr Makenzie to explain why not? According to my ideas of circulation, the colder volumes of water should lead in the race from the highest to the lowest point, whereas, according to this strata theory of circulation, the hotter volumes make the circuit of the pipes in less time than the colder. In an apparatus where this takes place the circulation is bad: the heat in the stoke-hole, where it is not wanted, is excessive; and in the houses, where it would be of use, it is unsteady and unsatisfactory. In conclusion, I quite agree with Mr Makenzie when he says it is evident that I have not mastered the subject. It is difficult to *master* any subject, however simple, and heating by hot water is rather a complicated one. The readers of 'The Gardener,' however, will form their own opinions as to whether Mr Makenzie's or my ideas on the question are the more correct.

J. HAMMOND.

BRAYTON HALL, 12th May 1879.

[We beg to thank several correspondents for their contributions on this subject, and regret that we cannot make room for them this month.—ED.]



THE CULTIVATION OF CLEMATIS.

WITHOUT doubt the varieties of Clematis have risen of late years to a very high degree of excellence, and we know of no other plants that can be used for such a variety of purposes, and none is more worthy of extended cultivation in private places. Yet we do not see them grown so extensively as they deserve to be, especially in pots, for the decoration of plant-houses. They are alike suitable for the ornamentation of rooms, either in small pots or in large ones; and the plants may be trained round balloon trellises, or umbrella-shaped standards, or in any conceivable form to suit the purpose and taste of the cultivator.

They are at home as climbers in the greenhouse or conservatory; and what can produce a more pleasing effect than these lovely plants when in flower, with their various and delicate shades of colour, hanging in festoons from the roof of plant-houses, intermixed with ever-green plants such as Passifloras, Tacsonias, &c., which considerably assist to hide the bareness of the Clematis when in a leafless state? We are aware the Clematis is somewhat objected to because it is deciduous; nevertheless, with a selection of sorts, some can be had in bloom nearly, if not quite, all the year. And this objection can be overcome by growing the plants in large pots, and removing them

from the house when the wood begins to ripen and the foliage loses its freshness. This certainly entails more labour, in training the plants round stakes to prevent them from being broken, until they again start into new growth.

The Clematis is valuable as an outdoor climber for furnishing walls and climbing over verandas, and produces a gorgeous effect when employed in pleasure-grounds in suitable nooks and corners. The *Jackmanii* type is most suitable for this purpose; still the old *C. flammula* with its small flowers is not to be ignored, especially if used where it can ramble at will and produce a semi-wild appearance. In fact, any of the class used for the purpose referred to are best left to enjoy the freedom of nature when the surroundings are of a natural character,—as when the limb of an old tree is given them to ramble over, or a portion of a broken-down wall, or anything that will be in character with the portion of the ground where they are employed. They can also be planted on the sides of banks and slopes in company with Ivies, *Cotoneasters*, *Heaths*, &c., to form a groundwork, with choice *Coniferæ* dotted at suitable distances, where this natural and easy system of planting is appreciated.

We have also seen *Jackmanii* used with great taste in the flower-garden; and few things are more beautiful than a number of these plants plunged into a large bed in pots, or planted out if intended to remain permanent, and trained over a low wire-trellis, say one foot or eighteen inches above the soil. When employed in such positions, as by the side of a winding walk banked more or less with shrubs, and in convenient places in large beds cut out in the turf, such plants can be used with advantage, and flower until very late in the autumn, if not cut off by early frosts.

Where conservatories have to be kept gay all the year with flowering plants, a number of Clematis grown in pots is invaluable. *C. indivisa lobata* is a charming plant in a pot, and useful for cutting: being an evergreen species, it is not at any season of the year unsightly. It can with judicious management be had in bloom by the end of January or February. For late winter and early spring, *C. Lady Londesborough* is the freest I am acquainted with: it stands forcing well, and produces its flowers in abundance early in the season, as it appears to do later on. *C. Lord Londesborough*, *Miss Bateman*, *Sophia*, *pleno*, *Mrs Barr*, *Mrs Badger*, *Standishii*, and *Lucie Lemoine* flower very freely a little later in the season. The *lanuginosa*, *Lawsoniana*, and *Henryii* type will not do for forcing, yet they will bloom freely in pots, and are worthy of pot-culture for the immense size of their flowers, especially the latter variety. *Jackmanii* and the *rubella* type are good summer and late-autumn bloomers.

The propagation of the Clematis is effected by means of grafting during April and May, or it can be done earlier if the young shoots have been advanced by artificial means. The time of the operation depends in a large degree upon the young shoots. The stocks can be kept from early winter until the wood is ready. The roots of common varieties are principally used for stocks,—in fact, good fleshy roots can be taken from any of the varieties. The strong roots should have some small fibres on them. The root should be split down the centre for about three-quarters of an inch; the scion or graft should be about three inches in length, containing one pair of leaves, which is sufficient for the graft; it should be cut into a wedge, fitted into the incision in the root, and then made secure with a tie of matting. Afterwards they should be potted in 3-inch pots in sandy loam, placed in the propagating-frame, shaded from strong sun, and well sprinkled overhead with the syringe: only a small space of time will elapse before the graft and stock unite. When the union has taken place, each plant should have a small upright stake to tie the small shoots to as they extend. If worked at the time named, they will be ready by the end of June to be transferred into 5-inch pots, using a compost of rich fibry loam, a seventh of well-decomposed manure, and sufficient sand to make the whole porous. These will make nice plants by the end of the season, and if well-ripened free-blooming varieties, will produce about six blooms each the following spring and summer.

When the young plants are removed from the propagating-frame, they require to be carefully shaded for a time from strong sun, and gradually exposed to more air. Care must be taken that they do not receive a check, which causes them to ripen instead of making a vigorous growth.

The Clematis enjoys liberal supplies of water while growing, and occasionally manure-water, and should have plenty of pot-room. After the plants have filled the 5-inch pots with roots, they can be transferred the following season into larger pots, according to the progress they have made. Care must be taken not to subject the plants to strong heat when forcing them into flower. The most suitable place for them is an early vinery or Peach-house when first started. One important point to be considered is, that if the plants are required to bloom early, their growth must be early matured, and the plants must receive an early rest by being placed outside. The summer- and autumn-blooming kinds can either be grown in a cold pit or in the open air all the season, and brought in while in flower.

WM. BARDNEY.

NOTES ON DECORATIVE GREENHOUSE PLANTS.

BOUVARDIAS.

CONSIDERING the usefulness of the Bouvardias as autumn- and winter-flowering plants, and especially when cut flowers are much in demand, they are not so generally nor so extensively grown as their merits deserve. Even in many places where they are grown, they are not cared for so well as they might be: indeed, one seldom sees what may be called a well-grown plant, the general run of them being long and leggy, with a tuft of leaves, and perhaps a small half-developed truss of flowers, at the top. Now, considering how easy the cultivation of these plants is, with a very small modicum of care they may be grown so that they will be an ornament to the greenhouse instead of being the reverse, and they will then amply repay the cultivator for the little extra care bestowed on them.

When there are a few old plants, they should be pruned back much in the way we do Fuchsias, and put into heat early in February, to get cuttings from. A vinery at work suits them well. When the young shoots are long enough to make cuttings—that is, when they have made three or four pairs of leaves—they may be taken off, and struck in the usual way, say in 6-inch pots. The pots should be filled with crocks to one third of their depth, and then a layer of ordinary soil, merely to form a bed for the silver-sand, which should be about one inch in depth. Insert the cuttings, press them pretty firmly into the sand, water through a fine-rosed pot, and plunge the pots up to the rim in a hotbed or other place where a brisk bottom-heat is maintained. They must be shaded from bright sun, and get an occasional dewing from a syringe in the evenings of hot days. They will have formed roots in about three weeks, when they may be potted off either singly in small pots or three plants in a 4-inch pot, using good fibry loam and leaf-mould in equal proportions, and a fourth part of silver or river sand. They should then be returned to the hotbed, or put into a warm pit, and kept rather close, and shaded for a few days, until they begin to root into the fresh soil. The temperature may range about 60° at night, with a corresponding rise by day. A slight dewing from the syringe on the evenings of bright days will very much refresh them. In the course of a few weeks they will want a shift into larger pots,—those in the small pots into 4-inch, and those in the 4-inch into 6-inch. They do not care for large shifts. A little peat-soil mixed with the other is an advantage to them, but not absolutely essential. They should be kept well pinched while young, so as to make nice bushy plants. In potting, the soil should be pressed firmly about them, as they are fine-rooting plants, and do not like a loose damp soil. In large pots especially, care is required in watering not to give it oftener than needed, and then in sufficient quantity to wet the whole soil in the pot.

They should be kept in a warm house until about the beginning of June, when, being previously hardened off, they may be turned out into cold frames or pits, and set on a bed of ashes; or still better, plunge the pots in the ashes, which will save such frequent waterings. Let them have plenty of light and air, and still attend to the pinching. A few of them may be introduced to a warm greenhouse about the beginning of October, when they will very soon come into flower: others may be introduced at intervals as required, but all of them should be housed before any danger from frost is anticipated.

Where pits or frames are not readily available, they will do nicely planted out in a moderately rich and sheltered border. In this case, however, they need not be shifted into larger than 4-inch pots at first, and not planted out before the middle of June, having been previously well hardened-off. Still attend to pinching and watering, if necessary. In the beginning of September they may be lifted carefully, and potted up either singly or in groups, as required. When potted, water them well, and set them in a cold frame, which must be kept close and shaded for a while, until they begin to root afresh, when shading may be dispensed with, and air given—moderately at first, and afterwards more liberally, until by-and-by the lights may be removed altogether through the day, replacing them at night. The after-treatment will be the same as described above. A successional batch of cuttings should be struck during the month of May, only these should be kept in pots and grown in cold frames or pits. These will come into bloom later in spring, and will be very useful, before forced flowers come in. Of course, the time of blooming will be regulated by the amount of pinching they receive. There are a good many varieties of *Bouvardia*, but we think the most generally useful are *Vreelandii*, *elegans*, *Humboldtii*, and *corymbiflora*.

J. G. W.



CHOICE HARDY SPRING-FLOWERS.

RESUMING my running selection of these beautiful gems of the flora of spring, I must draw attention to one or two which have been omitted in the connection in which they would naturally have occurred in last month's paper on the subject. The first of these, and one of the very choicest and most charming, is—

Menziesia empetrifolia.—Nothing can exceed the brilliant and distinct effect of this neat dwarf shrub when in flower. It literally clothes itself in its globular, heath-like, rosy-purple flowers in April and May, which in the mass have a luminous effect. It grows about 9 inches high, and is very compact and dense in habit. It should be accommodated with a compost of sandy peat, and is well worth any ordinary care and trouble to insure success.

Hutchinsia alpina is one of the neatest and most profuse bloomers

of the Cruciferæ. The whole plant when in bloom does not exceed 4 inches. The flowers are small, white, and densely profuse. It is usually grown in pots amongst collections of the choicer alpine-plants, but it is quite capable of being cultivated successfully in the front lines of mixed borders, and looks especially well on rock-work.

Polygala chamæbuxus purpurea.—This is an immense improvement on the old cream-coloured, and I suppose normal, form of this now not very common border-plant. The flowers are larger, the wings expanding considerably more than in the old variety: they are deep rosy-crimson, and in fine contrast with the bright-yellow, green-tipped keel.

Dodecatheon Meadia.—This, in its several varieties, is one of the most elegant and pleasing of choice spring flowers. It is now rarely met with—a regrettable circumstance in connection with a plant so beautiful, and one which, if fairly treated, is most easy to be cultivated. A deep, moist, yet not water-logged loam suits the requirements of the plant best; and it is benefited by partial shade. *D. integrifolium* is a very handsome species, with deeper crimson flowers than any of the varieties of *D. Meadia*. Both flower in April and May, but in the colder districts they are more likely in average seasons to unfold their flowers in June than earlier.

Primula.—The best of this genus for our present purpose are the early blooming hardy varieties of the Primrose, purple-white, and crimson and yellow. These are beautiful and very profuse-flowering plants, requiring but very ordinary conditions of culture to succeed well. There are also the *Polyanthus* in great variety, and hybrid forms bearing a resemblance in colouring to those, while in habit and size of the flowers they resemble the Primrose. These latter are beautiful things, which may be raised by the hundred from seed, and are most easy to maintain and increase afterwards by division when especially fine forms make their appearance, and render it desirable to perpetuate them.

Primula auricula.—The “Auricula” in all its splendid variety, too, is well worth growing more extensively than it is. Good strains of this is to be had from seed, which, like all other *Primulaceæ*, should if possible be sown as soon as it is ripe. There are not a few of the more distinct and beautiful species of *Primula* which succeed well in some places, both in the north and in the south, but not generally so well in the open ground as to recommend them to be included in a selection like this, which is merely intended to include such plants as will succeed well in any part of the country as simple border or bedding plants; so that many of the choicer alpine species of *Primula* must be passed over for the present.

Crocus.—All the species and varieties of this hardy and very beautiful genus are fit for the purpose for which these papers are written. Their gay colours, abundant floriferousness, and their simple cultural

requirements, render them most desirable plants for spring decoration. *C. Imperati* is one of the earliest to flower, with lilac and purple-coloured flowers. In mild winters it not unfrequently opens its flowers in January. *C. biflorus*, with white flowers, striped externally with purple, appears in February or March, according to the position and nature of the soil and the season of the year. *C. lacteus* flowers about the same time as the last-named, the flowers being cream or milky white,—a very pretty but not very generally grown sort. *C. reticulatus*, with golden-yellow flowers heavily marked with deep-brown lines at the base of the corolla externally, is the sort which is almost universally to be found in gardens of all classes. *C. vernus*, from which has sprung nearly all the common varieties, with purple, blue, white, and variegated flowers, is simply indispensable in the spring flower-garden. *C. versicolor*: this is another of the parents of the numerous race of common spring-flowering Crocus, the offspring not being always easy to distinguish from the varieties of the vernal crocus; but as swelling the bulk and numbers of beautiful spring flowers, they are very important.

Iris reticulata.—This is one of the most lovely of spring flowers. The deep brilliant violet-purple flowers, elegantly netted with orange, render it one of the most desirable of spring flowers. Unfortunately the plant is not hardy in all localities; and it is only its great beauty and exceptional attractiveness that induces me to notice it in this selection, so that those so favourably situated as regards soil and locality as to be able to grow it should include it among their pets. If the soil and bottom is dry and warm, it will suffer comparatively little from the severest cold it is likely to experience in any part of this country. It prefers a peaty compost, but will thrive well in a light sandy loam on a warm open bottom.

Sisyrinchium grandiflorum is one of the hardiest of its genus, but should be accommodated with a sheltered dry spot, so that it may be protected from the weather while in flower. The flowers are reddish purple, larger than most other species, and rather freely produced when the plant is suitably accommodated. There is a capital white-flowered variety, named *S. grandiflorum album*, which forms an excellent companion to the purple.

Galanthus—*Snowdrop*.—Of this little need be said, except that *G. nivalis* is so universally cultivated that no necessity remains for urging its more extended cultivation. *G. plicatus*, the Crimean Snowdrop, is sufficiently distinct in habit and in the greater size of the flowers to merit more extended culture. Notwithstanding it has been many years in this country, it is not plentiful: it does not increase so freely as the older species. The *G. Imperati*, more recently introduced to cultivation, is yet very scarce. I fail to see any feature in this to justify the laudations bestowed on it when introduced. As a form of Snowdrop, it is in no way superior to *G. nivalis*, except in the some-

what more pure white flowers ; while in point of size of flower and sturdy compactness of habit, it is decidedly inferior to *G. plicatus*.

Leucojum vernum.—A very beautiful Snowdrop-like subject in all its parts, but larger than any Snowdrop at present known. The flowers are pure white, tipped with green : they open in March. The plant is easily grown in almost any soil if the drainage is good.

W. SUTHERLAND.

CRAIGLEITH NURSERY, EDINBURGH.



THE GARDENER'S PRIMER.

NO. III.

A PRACTICAL acquaintance with the roots of different trees and shrubs will soon teach the gardener how to discriminate their distinctive characteristics of growth and smell, so as readily to distinguish the roots of the ubiquitous Birch, the Portugal Laurel, Laburnum, Quince, Scotch Fir, &c., or the Vine, or the beautiful roots of the seedling Asparagus, or the roots of the Tussilago Farfara (Coltsfoot), or the Couch-grass, or the Bell Bine, or the root of the Raspberry. Some plants, such as *Dracenas* and tuberous-rooted *Geraniums*, can be readily propagated by cuttings made of the roots.

Some plants, such as Ivy, are furnished with what are called adventitious roots, but as they are on the stem they are not true roots ; nevertheless such roots after they enter the soil perform the functions of true roots.

Some plant-growths are often called roots which are not so : they are prostrate or underground stems, such as the root of the Iris, which is supplied on its under surface with rootlets, on its upper surface with leaves, and is properly called a rhizome. The root of the Potato is an axillary bud on an underground stem. The corm of the Cyclamen, as it is sometimes called, is in reality an abrupt rhizome or root-stock, analogous to that of the *Primulaceæ*, to which family it belongs.

Bulbs are regarded as undeveloped stems or underground leaf-buds, from which true roots will grow, but never a tap-root. They are formed from seed, or from the axillary buds on the stem of the bulb, and when perfected are of annual duration only : the same Tulip does not blossom the second time. There are tunicated bulbs, as *Hyacinthus orientalis* ; scaly bulbs, as *Lilium candidum* ; and these scales, on removal from the bulb, may be propagated, and will form bulbs. Some plants of the *Araceæ* family will produce tuber-buds above ground ; other tuberous-rooted plants, such as *Gesneraceæ*, will produce, from the leaf, roots which soon develop tubers like the

parent plant, if scientifically treated for that purpose, of which more will be written hereafter.

Pseudo bulbs, or pseudo tubers, of Orchids, are of green colour above ground, thickening at the base of the stem. In the *Dendrobium* they assume the form of an ascending stem, and bear on it the beautiful flowers. The function is that of a reservoir to supply to the next pseudo bulb and flower nourishment. The pseudo (stem-like) bulb of *Dendrobium* possesses the faculty, on division into cuttings, of throwing out aerial roots and forming a new plant: possibly the joints in the stem are allied to nodes, if not identical.

The organisation of the roots of the plant is so beautifully adapted to the functions they have to perform, that they go, as it were, in search of and to select their food, often long distances, penetrating through crevices in the soil. The root-cells are considered to be the immediate absorbers, and are easily and often replaced; but there is no sufficient reason for considering that in dicotyledonous plants they are formed annually, as has been sometimes stated. Water in some form, either as vapour or as liquid containing in solution carbon dioxide (carbonic acid), ammonia, and saline elements, is the medium by which plants absorb their food.

So great is the attractive force of the liquid in a plant set in motion by the action of these root-cells, and of a certain amount of heat which is necessary, and of the cell-walls of the root, stem, and leaves, that the absorbed liquid passes from cell to cell, filling them up, passing into the stem, distending the cell-walls, and enlarging the same, and thence to the leaves, where it is elaborated, and the liquid is called sap. This process of the strange phenomenon of liquids attracting each other through a vegetable tissue, as the cell-wall or membrane of cellulose, is known by the name of *osmose* (*osmosis*, or impulse): the outward flow is called *exosmosis*, the inward flow is called *endosmosis*. Its power varies: some organic substances have little or no *osmose*, others produce it to a great extent, and others have a negative *osmose*. This osmotic action has been called hydrostatic pressure, and in grape-sugar it is very great, as may be readily seen in the warmth of spring, when Vines bleed, as it is called, if cut before the leaf-growth has commenced to utilise the sap. Schleiden says that *endosmosis* is assisted by absorption of cell contents, caused by evaporation of the watery fluid through the leaves: in other words, as all the cells are filled with fluid, evaporation empties them, and therefore the greatest flow of sap is where, and when, the plant has most evaporating organs.

A good example of the power of endosmotic force may be seen sometimes in a vinery, when a young rod is carried up from an old

Vine: the force is so much stronger in the young than in the older rods, that they will be prejudicially affected by their younger relative, until the equilibrium is restored by the flow of sap equally, in the old and new wood, which will probably not be the case during the first year of its growth. The flow of liquid induced by exhalation or evaporation is not necessarily a process of growth, although, like it, it is towards the youngest portions of the plant; it may go on after the growth of foliage on a tree is completed.

Each plant has a stem, either above or below the ground (the plumule of the seed elongated), for supporting leaves, buds, or flowers, and through it the liquid-sap absorbed by the roots and the gases absorbed from the atmosphere and decomposed in the leaves circulate through the plant structure. The stem is either simple or branched; it may be more or less destitute of leaves, as in different species of Cactus, Euphorbia, and Stapelia, where the epidermis acts the part of a leaf. The stem is terminated by a bud (called *punctum vegetationis*) at every point, consisting of embryo leaves packed closely together, and at intervals on the stem or branch are nodes or joints, from which buds and leaves grow (in Pinks, Carnations, and Grasses the nodes are very much swollen); and the spaces between these nodes are called internodes.

The stem may be erect (*erectus*), or procumbent (*procumbens*), or creeping (*repens*), or reclining (*reclinatus*), or arcuate (curved), so as to form part of a circle, as the Bramble; or clinging to any object for support by fibres, as the Ivy (*radicans*); or climbing by means of tendrils, as the Vine (*scandens*); twining spirally round other plants, as Honeysuckle (*volutilis*); or supple, pliant, whip-like, as Jasmine (*flagelliformis*); or trailing, as a runner of the Strawberry (*sarmentosus*); straight, as in Lily (*rectus*); two-ranked when branches spread in two horizontal directions (*distichus*); branched, as in the Apple (*ramosus*); proliferous (*prolifer*), bearing branches on the summit of the others, as in Scotch Fir; articulate-jointed, as in the Indian Fig family (*Opuntia*), &c.

The shape of the stem may be either round, terete (*teres*) or two-edged, ancipital (*anceps*) or three-edged or triangular (*triquetrous*), or square (*quadrangularis*), or five-sided (*quinquangularis*), &c.

The surface (epidermis) of the stem may be either smooth (*glaber*), viscid (*viscidus*), warty (*verrucosus*), papillose (*papillosus*), rough (*scaber*), downy (*tomentosus*), shaggy (*villosus*), glaucous (*glaucus*), striated (*striatus*), furrowed (*sulcatus*), spotted (*maculatus*); sometimes there are states of the epidermis, or attachments to it, producing hairs, glandular hairs, prickles, &c., but thorns are attached to the wood.

In its earliest stage the stem consists of cells closely packed together, which, from their crowded state and consequent pressure during growth, assume various shapes called cellular tissue; and if the texture of it is hexagonal, it is called parenchyma (from its supposed likeness to liver or lungs). There are other forms of cellular tissue in it, as vascular tissue, which includes woody tissue and fibro-cellular tissue (cell with a spiral coiled up in it), but one and all these forms are only modifications of cellular tissue.

LABORE VINCES.



NEW ZEALAND FORESTS.

THE mystic law of association seems to crowd around the word forest—the idea of all that is voracious in the brute, cunning in the reptile, or treacherous in the savage. Were we transferred to the jungles of India, the backwoods of America, or even the more immediate bush of Australia, we might experience such treachery, cunning, or voracity. But in the peaceful shades of New Zealand forests the traveller may rest at ease, without fearful apprehensions of attacks by savagery in any form whatever.

Unlike the open forest of the sister colony, the New Zealand forest presents one mass of dense vegetation; much of it seems to take the shape of an immense cone, commencing with the lesser forms of vegetation, and gradually rising, until in the centre the giants of the forest attain to an altitude of from 100 to 200 feet. The interior of the forest presents a strange appearance, causing one to think that nature had attempted the humours in place of the grand or sublime. For the grotesque forms of parasites, the strange positions of twisted trees bending in all shapes so as to obtain space for growth, with here and there the dead and dying endeavouring to reach the ground, form figures, some of which would puzzle a Euclid to describe. But amid all we find ample food for reflection, in considering that while men congregate together, forming nations which in succession rise and fall by the clashing of arms or the degeneracy of power, Nature, as if all unconscious of such changes, unremittingly continues her labour with fibre and tube, and the wondrous mechanism of a thousand leaves—thus building up these mighty forests, which patiently await the time when the adventurous explorer shall break in upon her solitude, and open to the world another field of enterprise. The New Zealand forest is entirely evergreen, and though the return of spring is not visible in a fresh outburst of foliage, which makes the woodlands of the old country so attractive, yet there is compensation in the landscape being spared from the desolating appearance of leafless trees.

Many of those plants which adorn our conservatories with continual freshness are natives of this forest. For instance, the Tree-Fern Dick-

sonia antarctica is well known for its majestic appearance, but it should certainly be seen in this its natural habitat, with stems 20 feet high, crowned by fronds from 8 to 10 feet long. To stand at the side of a chasm and look down its rugged sides clothed with *Blechnum* and Mosses, a gushing stream sparkling at the base, and one of these giant Ferns filling up the centre, is but a sample of the many natural ferneries which the traveller comes across. Another exile known to most lovers of Palms is *Areca sapida*. It soon overtops the Tree-Ferns, while the different shades of green make a pleasing contrast. In spring it throws out bunches of red berries, which are much prized by the natives, while the leaves are used by many settlers for thatching purposes. In its habit of growth it seems to shun all exposure, and seeks the shelter of other trees. Often it is found in places completely guarded against both sun and wind. We have a species of Cabbage tree, which from its hardy habit would do well for "subtropical gardening." In leaf it is much like a *Dracæna*, and when seen at a distance looks very like a plume of feathers. For greenhouse decoration in winter it would be a pleasing object. Another denizen of the forest here is *Dacrydium cupressinum*, a plant which has not received the attention which it deserves. It has been in cultivation more or less for thirty years, and having been numbered with the Juniper family, may in some collections be found labelled *Juniperus elata*. The brightness of its evergreen foliage, which retains vigour and freshness throughout the entire year, with innumerable waving branches bending with feathery lightness to the most gentle breezes, including a pleasing symmetry of form, all tend to give it rank amongst the rare and beautiful, and make it a most desirable plant for greenhouse culture.

We may now notice one or two of the timber trees which constitute the wealth of the New Zealand forest. The foremost of these belongs to the natural order *Coniferæ*, and is known to collectors of hard-woods as *Dammara australis*. Leaving out some of our British Oaks of historic fame, it would be almost impossible to find a more stately tree. It is common to meet with it in the forest of the North Island, rising to a height of 150 feet, and measuring 30 feet in circumference at the base. The wood is very inflammable, from the amount of resin contained in it; and this no doubt accounts for vast extents of such forest having been accidentally burnt. It exudes a valuable gum, which has become an important article of commerce. For shipbuilding it is considered equal to Oak, and large quantities are annually exported for that purpose. Another timber of colonial reputation is a species of the Chinese Pine, *Podocarpus totara*. In foliage it is somewhat sombre; the wood is so close in the grain as to be termed "iron wood" by the natives, and is of course very durable. As indicative of the wide domain of some of our botanical orders, we may mention that the *Verbena* has a representative here, which ranks

amongst the finest timber trees which the colony possesses—we allude to *Vitex litoralis*. After the first few years of growth it begins to assume form, which ever after marks it as one of the handsomest trees of the forest; and for the construction of wharfs and bridges, and every variety of work where it is necessary that wood be placed under water or deeply imbedded in the earth, its timber is considered invaluable.

The New Zealand forest cannot be said to be rich in floral productions. There are, however, some which deserve notice. Foremost of these, for peculiarity of growth and gaiety of flower, ranks the *Rata* or *Metrosideros lucida*. It commences to entwine round other trees as a very slim climber, but its growth is so rapid that it quickly encircles the whole tree. With every fold it tightens its grasp until all vitality is entirely crushed out of the trunk round which it clung for support. So does it enclose it with its own growth, that but for its twisted form of timber nothing would remain to tell of the encoffined tree. Many of them grow to an immense size, and the wood is much used by wheelwrights for special purposes in the craft. Another member of the same family, *Metrosideros tomentosus*, makes the forest somewhat gay during the months of December and January. Its flowers are scarlet and of capitulum inflorescence. British residents have honoured it with the name of “Christmas tree,” and it goes to form part in church decoration during that festive season. Another floral attraction in the forest is *Clematis Nova Zealandia*. It provides itself with a natural trellis-work by entwining the rugged stem, and then hanging down from the branches in long festoons. The flowers are pure white, and produced in rich profusion; and being a spring flower, is to the natives as a floral almanac, telling them when to plant their much-prized Kumara or Sweet Potato.

We might continue our list to a much greater extent, there being 140 different species of timber already recognised in the trade. These few “jottings” will, however, give some idea of the forest-lands of the “Britain of the South.”

WILLIAM FORBES.

AUCKLAND, N.Z.



LIBONIA FLORIBUNDA.

THIS is one of the most useful and showy of stove spring-flowering plants, which produces its orange-yellow bells in great profusion when carefully cultivated. The plant is simple to propagate and cultivate, but is somewhat difficult to ripen into a free-flowering state, unless its requirements are thoroughly understood. Cuttings taken of it during the months of March and April, or small plants of it purchased from the nursery, and grown on, will

make nice plants for furnishing next spring, and will with ordinary care develop into fine bushes the following season.

In preparing for inserting the cuttings, the pots should be washed clean, and drained by the ordinary process, and then filled with a mixture of well-decomposed leaf-mould mixed with sharp sand—say in the proportion of one-third of the latter to two-thirds of the former. It will also be advisable to leave space to the depth of an inch on the surface of the pots for a layer of pure sharp sand, which should be pressed down with the fingers and made firm, and into which the cuttings should be inserted. The cuttings should be selected from a clean healthy stock; and of course it is understood that in all cases of propagating, the materials employed should be of the same temperature as that from which the cuttings are taken, and be in good working condition,—that is, to be neither too wet nor too dry. After the cuttings are inserted, the pots should be plunged in a pit or propagating-frame with a bottom-heat of 85°. There is no objection to propagating such plants in a frame with the ordinary bedding plants, such as Verbenas, &c.; but if a moderate bottom-heat is at command in a pit heated by hot-water pipes, the latter should be preferred, as being more conducive to a steady growth than the conditions of the former, as heat fluctuates so rapidly in an ordinary dung-frame when exposed to the external conditions of an ever-varying atmosphere; but, as before remarked, much depends upon circumstances, such as season of propagating, locality, situation, &c. &c. Assuming, however, that the cuttings have been plunged in a bottom-heat such as that recommended, they will soon form roots if the necessary conditions are observed in the way of shading, syringing, and watering.

After the young plants are sufficiently rooted they ought to be shaken in the plunging material, leaving a vacuum between the pot and the material in which it is plunged, preparatory to placing the cutting-pot upon the surface of the bed, to prevent anything like an abrupt check to growth. The same conditions of atmospheric treatment will still require to be maintained, except that the shading may be dispensed with after the cuttings have furnished themselves with roots, until the plants are ready for potting, which will be as soon as they are fit to be handled, and are large enough to be shifted into 3-inch pots. Before they are shifted, the soil for potting should be got in readiness, by having it mixed and laid up in a heated shed, or at all events in some dry place where it can be taken from and warmed to the necessary temperature a few hours before it is required for potting. The soil should be mainly friable loam, with a dash of leaf-mould and sand mixed with it. Rich soils and over-

potting are to be avoided in the cultivation of these plants, especially in the northern parts of the kingdom, where light and sunshine are at a minimum. The plants would only require all the more ripening if their treatment were such as to induce soft growth, and the probability of flowers would be less also.

When the plants are potted, the soil should be made firmer about their roots than is usually done for soft-wooded plants; and they may be returned to the propagating-bed and placed on the surface of it, or in some other place where the conditions will be somewhat the same, till they root afresh in the new soil, and are found to be growing both at root and top, when the young shoots may be pinched so as to furnish the plant with from six to eight shoots. With regard to pinching, it may be observed that perhaps to this being done too often and too late in the season, and to the plant being kept too long in heat, may be attributed the quantities of flowerless plants that are frequently to be seen. Better have half a dozen firm shoots well ripened and in a flowering condition than double that number in an imperfect state.

As soon as the young shoots break after being pinched, it will be better to shift the plants to a position nearer the glass where they will get plenty of air and light, and where they will make short-jointed stubby growth.

From this date onwards (until the weather becomes warm enough to turn them out into a cold frame) there is no position that would suit them better than that of a low pit with a single hot-water pipe round it, where a regular temperature could be maintained, and where air could be given more or less during the greater part of the day without running the risk of doing injury to other things.

It is not, however, an absolute necessity that this should be the case, as the plants can be very well grown in any Cucumber pit, vinery, or plant-house where there is a little heat to start them in. In this case they should be carefully hardened off by removing them gradually into a lower temperature for some time before they are turned out into their summer quarters.

From 4 to 6 inch pots will be large enough to grow the plants in the first season—certainly for furnishing purposes the 4-inch size will be the best, as the plants in them will be the most likely to flower.

Before the plants are turned out into frames in June, or even where they are grown under the improved facilities elsewhere referred to in the shape of heated pits, their condition should be rigidly inspected, and if they are not in a sufficiently advanced state to undergo the change, they ought to be encouraged, by such means

as are at command, to hasten that desirable condition of early well-developed growth before they are exposed to the atmosphere of a cold frame. At the same time, in a warm climate and in a "favourable season," there is no doubt but that these plants could be well managed without a particle of fire-heat after they had a little warmth to start them in; and their growth, although a little shorter than that made in a warmer and closer atmosphere, would be as certain, if not more so, to yield an abundance of flowers, provided it was thoroughly ripened in the autumn. When the plants are housed they ought to be kept near the light and only moderately supplied with water, as they are liable to suffer and lose their leaves if over-watered and kept in a low temperature. When they are required to come into flower, the temperature should be raised gradually to that of a warm greenhouse, and afterwards increased as circumstances may require. Year-old plants that are trimmed back are treated much the same as plants that are raised from cuttings, except that in the latter case they do not require a high temperature at any time. They are partially shaken out and repotted, and when started in a gentle warmth they grow freely and make fine bushes the second season.

W. HINDS.

ALTHOUGH within the last few years this beautiful and useful greenhouse plant has been several times brought under the notice of your readers by various writers, it is astonishing that we see it so seldom adorning the stages of the amateur's greenhouse. When in full bloom, the appearance of the plant is highly effective. The flowers, which are of a tubular shape, red and yellow in colour, present a telling contrast with the rich glossy foliage, which is a striking feature of the plant. If a proper system of culture has been previously followed, the plants will begin flowering in November, and continue to flower for months. The particular plant in my possession began flowering at the time referred to, and is still in flower at this date (12th March). Younger plants will come on in succession. The propagation and culture of this plant are not necessarily a difficult matter, therefore good growers of the ordinary run of soft-wooded greenhouse plants need have no hesitation on that score in beginning with it. Cuttings of the young wood inserted in the usual light compost root readily at this season, when placed in a warm, moist temperature, and kept close and shaded. When sufficiently rooted, they should at once be potted off into thumb pots, in a compost of loam, sand, and horse-droppings, or some bone-meal. If leaf-mould is mixed with the soil, it should be only a very

little, as it causes a watery growth. Return the plants to the quarters they were struck in till they are established in the pots; and they will require shading from direct sunshine for a few days after being potted; and then two shifts, first into 4-inch, and lastly into 6-inch, pots, will in general be sufficient to grow plants large enough for ordinary purposes. Over-potting the plants should be guarded against, especially those wanted in flower before midwinter. By timely attention to this matter much disappointment may be avoided. Plants in large pots are apt to continue in free growth till the season is too far advanced to insure the maturity of the young wood, upon which a crop of flowers depend. The plants do well grown in a cold pit or frame from June and onwards during the summer months, when they are attended regularly in regard to the usual items of watering, staking, tying, and pinching to keep them stocky. The method of cultivation adopted by the "Squire's Gardener," which he detailed in your pages some years ago—viz., that of turning the plants out into earth-pits, is worth the attention of those whose labour power is limited, and who are expected to keep up large numbers of flowering-plants with, at best, inadequate means of doing so. I have adopted this method in the case of *Cyclamens* with good results. Unless a good position not far from the glass can be afforded them in the greenhouse, there need be no hurry in housing the plants in autumn, as they will do far better in a frame than when huddled along with other plants which already may have too little room. The flowers are produced freely in a comparatively cool greenhouse with a dry atmosphere. They should be carefully and regularly attended to with water in a tepid condition throughout the winter months.

D. MACKIE.

AYRSHIRE.



GLOXINIA CULTURE.

THE *Gloxinia* is now becoming a very popular plant, and most deservedly so; for the beautiful varieties now in cultivation have a grand and very effective appearance when in full flower. Those desirous of having a few plants in their stove collection should procure a packet of seed from some well-known grower, and from some good strain, and sow it at once in gentle heat. The seeds should be sown thinly and evenly on a fine surface, and simply dusted over with light soil,—watered with tepid water through a fine rose, covered with a piece of glass and placed in gentle heat, and never allowed to become too dry or kept too wet, as the seedlings may damp off. Whenever the plants are noticed above the soil, the glass should be removed, and a little shade afforded them when the sun is very strong. As soon as

they are fit to handle the young plants should be pricked off into small thumb-pots or seed-pans, gently watered, and shaded for a few days till they take to the new soil. The soil best suited for these is an equal mixture of good fibrous peat, loam, leaf-mould, and about a sixth part of sand when the plants are small, with the addition of charcoal, bone-dust, and thoroughly decomposed cow-dung when the plants attain size and strength and require to be shifted on into larger pots.

Existing varieties should be repotted annually as soon as the bulbs begin to grow ; and in doing so the old soil must be entirely removed, which can be easily accomplished if the bulbs are allowed to become rather dry. It is also advisable to put them into smaller pots, of size sufficient to allow an inch or so of fresh soil between the bulbs and the sides of the pots—this will allow of their being shifted once or twice during the summer before the flowering season. They must be shifted on whenever the roots reach the sides of the pots ; and when growing freely they must be carefully watered and kept in a light, airy position near the glass without exposing them to cold draughts. A little guano-water may be given occasionally ; and when the flowers begin to expand a slight shade will be necessary to prolong the flowering season as much as possible. Choice varieties can be propagated from cuttings and leaves taken off with a sharp knife and inserted in 4- or 5-inch pots in light soil, with a layer of silver sand on the surface, and covered with a bell-glass. When the flowering season is past and the growth nearly finished, stand them out in a cold frame, fully exposed to the sun, until they are thoroughly ripened and gone to rest, when they can be stored away in any place where they can be kept cool and moderately dry until wanted for potting again. DUNDONIAN.



HARDY FRUITS.

WITH all the favourable reports from the great fruit-growing districts of the "promise" for fruit crops, and the singular lateness of the season which is likely to keep the flower-buds from opening, so that they would be out of danger of late frosts, yet the buds are open or opening, and the severity of the weather decreases but little, so disappointment may come after all. On looking over a very fine "set" of Peaches and Nectarines on the open walls, we find the greater portion of them black and soft as pulp. We fear if a favourable change does not come soon (May 14), the sanguine hopes of the great fruit-cultivators will be greatly modified.

Trees trained to walls and other fences will now require a general overhaul. The strong shoots which are so general on healthy trees may require stopping before they rob their fellows. Thin out all shoots not wanted for next season's fruit-bearing ; endeavour to get all bare portions of the walls covered—not at random, however, but by systematic training, keeping the shoots as straight as possible, pointing regularly in the right direction—that is, when fan-training is practised. If horizontal-training be the style adopted, then lead them in lines running straight with the bricks. Where wires have

been placed, the horizontal system is partially carried out. Perpendicular training is gaining in favour with many, and it answers well where walls require partly filling-up. A tree with from two to four and six upright shoots, trained from 8 inches to 1 foot apart, will produce a large quantity of fruit. Whatever the favourite method is, there should be no vacant space on the walls, and there should be no crowding of branches together. The crowding system defeats every effort to secure crops of fruit. In the autumn, when sun and air should have free access to every leaf and branch, by crowding the current year's growth the ripening process is much retarded or entirely prevented. The labour that crowding gives, too, is very objectionable, especially where labour power is limited. All outward growing shoots are objectionable: if fruit sets on them, they are kept from the walls and lose their protection; in course of time they become ugly and unfruitful. This applies to Peaches, Nectarines, Plums, and Apricots. Dryness at the roots of newly-planted trees should be remedied by applications of soft-water which has been exposed to the atmosphere. If trees are starting weakly into growth, guano-water would be of service in starting them. A mulching of good rotten manure is of much benefit, by keeping the roots cool and nourishing them.

Aphis and other insects are generally found to become active at this season, and they should not be allowed to have a footing on the foliage. Tobacco-water or tobacco-powder dusted over the trees, or syringed on them, mixed in water, or Gishurst's compound in 2 ounces per gallon, are some of the most destructive remedies, and no insect life can stand against them. However, if the vermin should get established, the remedies must be applied almost daily. The grub found on Apricots, curled up in the leaves, can only be mastered effectually with thumb and finger. Morello Cherries are very subject to black-fly—a most formidable insect: a small vessel filled with Gishurst's compound, and the points of the shoots dipped in the liquid, will do much to destroy the brood; but often, where the foliage is close to the walls, the best plan is to nip off the points of the diseased shoots and burn them.

Pears, as a rule, are not so liable to aphis, but are subject to scale, which is worse still: syringing with warm soapy water will do much to act as a preventive. During winter, when the foliage is off, a painting of soft-soap, soot, and sulphur would kill scale—a brushing with soft-soap and water would destroy the greater portion of insect life. When Pears have made good growth, it is well to begin shortening the young shoots in time. The method of stripping the trees all at once is objectionable: some do not allow the young growths to form at all, but we prefer the medium course, and begin at top of the trees, say about the third week in June, and shorten back about a third of them; in a few weeks later the middle portion of the trees are trimmed back, and later the bottom portion of the tree has attention. We have seen this system answer admirably: with many years in succession there were loads of fruit always to thin off. In autumn, when growth ceased, the shoots were well cut in, and many buds were thus formed. In winter there was little else to be done. Apples as espaliers we would always treat in the same manner. When wood became extra gross and spongy, root-lifting piecemeal is had recourse to; not left to winter, as is often done, but during the latter part of summer or early in autumn. Suckers must not be allowed to grow, but be taken off as soon as they appear. Cherries and Plums are very liable to form suckers also, and should be often looked over to see that none are growing from the roots or below the graft. Grafts must be looked over, and the ties partially

or altogether loosened to allow them to swell. Budding may now be done: it is simply forming a slip in the bark of a stock, cutting across, forming the letter T. The bark is raised up and the bud (which has been previously divested of its wood, the bark cut to fit that in the stock) is slipped in and fitted neatly, with the point alone exposed, and all the other portion being neatly bound closely with soft matting. Standard trees receive little help during summer; but if time and means would allow, they could be kept in fruiting condition and made handsome by attention to disbudding. Open hearts for bush-shaped trees, and the permanent branches kept at regular distances, is very desirable.

Pyramids, being generally dwarf and more come-at-able, receive more careful attention. They may be thinned and stopped as the growth of the tree indicates. Keeping a straight centre shoot, and the others branching out and upwards at equal distances, demands attention. This rule applies to all trees and plants, as the stopping of one shoot strengthens the others. Dwarf-bushes known as small fruits require the same attention as directed for last month.

Figs will now be making rapid growth, and where grown thinly with leading shoots and short spur-looking wood, should be encouraged, for it is always fruitful. These young growths should be carefully gone over, and the points squeezed at every fourth leaf or so. If plenty of fruit is showing, they should be exposed to the sun as much as can be done. If there is a wall to cover, leading shoots should be trained and kept as leaders. Figs do admirably with any kind of training. Just as the Pear is manageable, so is the Fig. Cordons, either as large or small trees, can be made and kept fruitful. Such sorts as Castle Kennedy, Gros vert, and Brunswick, often require much cramping at their roots, and even a little cutting, to keep them stiff in growth and fruitful. Brown Turkey and White Marseilles hold their own with most Fig fanciers, yet Negro Largo is a fine and free bearer.

In the orchard-house abundance of work will give the cultivator exercise of body and mind, if he is an enthusiast. Thinning of fruit, keeping down insects by fumigation and washes, stopping of shoots to direct the course of those left, keeping the trees from becoming matted, careful ventilation, watering with care, giving thorough soakings of weak manure-water, syringing plentifully, keeping healthy open surfaces of pots and borders, and applying wholesome mulching of rotten manure,—are objects which all in their part tend to make orchard-house tree-culture a success, and be something different to the starvation method we often see.

M. T.



HEATING BY HOT WATER.

YOUR correspondents Mr Inglis and C. M. cannot agree with Mr Hammond's theory of the circulation of hot water in pipes; and, as you remark, "it is quite evident that this is a subject that requires to be discussed." I thought Mr Hammond's reasoning so clear that no one would have thought of disputing it, as Mr Inglis and C. M. have done. There is a small stove here, the heating of which is a practical illustration of the correctness of Mr Hammond's remarks. The structure in question is 30 feet long and 13 feet wide. It is heated by a saddle-boiler, which would do its work well enough were it not that the flow-pipe has a continuous rise all the way along one side, back the same side,

round one end, and along the other side, returning back to the boiler. The rise in the 90 feet of piping is exactly 18 inches. I find, under these circumstances, that before the water at the end furthest from the boiler is perceptibly warm, the flow as it leaves the boiler is unbearably hot. Indeed in mild weather, when hard firing is not called for, the highest pipes at the far end never heat at all, while the first length or two of pipes are far too hot. Besides this, the upper sides of the pipes a few feet from the boiler are always much hotter than the under sides. I know of another instance in which the pipes were placed in the way I have described, and with precisely the same results. Lately, however, in this case, the arrangement of the pipes has been altered, and they are placed on the level with a gentle fall for the return pipe, with the result that the heat is now much more equally distributed in the pipes, the difference of temperature at 6 feet from the boiler from the temperature at 60 feet being scarcely perceptible to the hand—two-thirds of the fuel formerly required being now sufficient to maintain the requisite temperature.

In heating different houses from one boiler they certainly should, if possible, be all on the same level. Of course this has nothing to do with the matter in dispute, only it is an arrangement which has been too seldom recognised and is apparently misunderstood. It is when houses are all on the same level that the principle laid down by Mr Hammond is most easily applied.

Mr Inglis and C. M. may depend upon the correctness of Mr Hammond's remarks regarding a double circulation in the pipes when the pipes ascend. Mr Inglis compares the circulation of hot water to the drawing of water by a syphon. The two principles have nothing in common. Water circulates in hot-water pipes by reason of the different specific gravities of hot and cold water. On the other hand, a syphon acts by means of the pressure of air, and the temperature of the water has nothing whatever to do with it. Mr Inglis reasons about a heavy column of water pulling a lighter one in its wake, but cold water *will* run down. How, then, is it natural for water undergoing a *cooling* process immediately it enters a hothouse to *run up-hill* in a pipe in which the hottest water is at the lowest part of it? It is, as Mr Hammond says, in this case that a double circulation takes place, or the heat would never advance. Both Mr Inglis and C. M. lay great stress on heated water having a tendency to rise, and hence they consider that what is termed a flow-pipe ought to rise. Being unfortunately bothered with a heating apparatus which they consider properly fixed, I find it the best possible illustration of Mr Hammond's views. Water is heated very slowly indeed by conduction; and I venture to say there is not an apparatus anywhere where the flow-pipe has a continuous rise in which the colder water is not returning silently at the under side of the pipe, while the warm current at the upper side is going in the opposite direction. Water in a hot-water apparatus should not be wanted to heat by convection; and if it does, there must be something wrong—and that something is a rising flow-pipe, which is wrong in principle and wrong in practice.

C. M. asserts that the point furthest from the boiler is the hottest when the pipes rise to that point. Does he mean by this that the water gains heat instead of parting with it to heat the air? The fact is, it begins to cool the moment it leaves the boiler, and the point where it enters the hothouse ought to be its highest. If it were as C. M. asserts, we ought to take the pipes a long round-about up-hill, for the sake of the heat they would gain. Not to enter further into the subject, I consider Mr Hammond's reasoning the most correct teaching I have yet met with on heating by hot water. A. H.

HOT-WATER CIRCULATION.

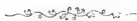
It is not likely that anything new can be added to what is already known on the subject of hot-water circulation—the whole matter has again been made plain by your correspondent, Mr J. Inglis. The heat from the fire rarefying the water, disturbs its equilibrium, and the warmed particles through their buoyancy, like a cork, are forced to ascend, and the cold water, from its greater density, descends to fill its place. It is quite easy to see, however, that your able correspondent, Mr Hammond, is right so far. For a time a counter-current must be produced in the same pipe, the heated water flowing along the upper curve of the pipe, and the cold returning along the under side, like water in the eave-gutter. One's hand placed first on the upper surface and then on the under side of the pipe, will at once prove the truth of this; and this fact may appear to retard the circulation for a short time, supposing a fire just lighted under a cold boiler. This appears to be all Mr Hammond contends for, although his facts may not quite justify his conclusions. The illustration of the siphon is used to explain the movement of the water, and though it does not explain all, it is true as far as it goes: the balance of weight in favour of the cold water running down a perpendicular pipe or an inclined plane must accelerate the circulation, if it does not originate it. A very curious instance of the effect of the cold water in deciding the course of the circulation once took place in our experience. It was in this wise: a boiler with three distinct sets of pipes attached was just out of the hands of the mechanics, and all concerned were impatient to see the apparatus tested. One set of pipes was all but on a level with the boiler, another set was some 5 feet and the third set was 10 feet above the boiler. Each set was laid nearly level, but with a perpendicular dip where attached to the boiler. It is with the 10-feet set we have to record our experience more particularly. A good fire was first made to heat the flues and dry the boiler outside, then water was slowly poured into the apparatus down the flow-pipe of the 10-feet set, when very soon the warm water was circulating in the lowest set of pipes, but as the filling proceeded, these again grew cold, and the middle set became warm. The filling went on as described down the flow-pipe of the upper set into the boiler, when the warm water gradually rose up the return pipe, flowed round, and finally arrived by that route into the flow, where the cold water was being run off at a small expansion-box over the boiler. The filling finished, to our temporary astonishment the circulation continued the reverse way, the warm water rising in the return pipe and returning to the boiler down the flow-pipe. This was to all appearance reversing the order of nature. We have somewhere read that the laws of nature are the same all the world over, except in Ireland; but the above incident took place in England, where the laws of mechanics and those relating to liquids work har-

moniously, and consequently those of nature could not really be reversed this time : the water was only wrong in taking the wrong course, the pipes being new and coming from Scotland. After logically settling this point, the whole on reflection was explained by the fact of there being 10 feet of perpendicular pipe, which contained continuously the coldest and consequently the heaviest portion of the water, and out-balanced the warm water rising in the return. We suffered much mental uneasiness in having the laws of nature thus apparently treated so contemptuously by our new apparatus ; so after a few weeks' action, and no change likely to be voluntarily effected in its behaviour, we stopped the fire and cooled the water, and started afresh, this time with full pipes and a proper and orderly course of procedure on the part of the water. The share which the principle of the siphon has in the circulation of hot water was thus very excellently and accidentally illustrated. The boiler, from the nature of the position, was not sunk in the earth, although so much below the upper set of pipes. But after all, the fire is the great mover of the water, as the sun moves the winds : and as an eminent horticultural writer some years ago lucidly ventilated and illustrated the theory of hot-water circulation by showing the effects of the sun in originating the Gulf Stream, whereby the climate of these fortunate islands was maintained at a forcing-house temperature ; and as the water is made to move in a system of pipes independently of the auxiliary principle of the siphon ;—so, after all, the sinking of boilers in deep stoke-holes may not be an expedient of such necessity, if some other auxiliary can be substituted for the siphon. As the cold water, from its density, has a drawing power down an inclined plane, so hot water, from its rarity, may be made to exercise a lifting power, like a balloon, or like smoke up a chimney.

We have known more than one heating-apparatus erected with the view of taking advantage of this effect of heated water, the motive power on the fire being above the level of the return, in consequence of the difficulty of sinking the boiler. I may say the whole of the pipes connected with the boiler were return-pipes, with just this exception that the heated water rose at once to a considerable height above the boiler, 9 feet at least, where it was discharged into an expansion-box, and thence distributed to the various houses by other pipes opening into the expansion-box—the return-pipes, so to speak, entering level into the bottom of the boiler. The apparatus worked satisfactorily : the gardener was a well-known prize-taker at the district shows. By this plan several difficulties of doors and passages were overcome, which could not have been effected on the siphon principle. One other apparatus we remember, on a large scale on the same principle, fixed by Messrs Weeks. There really seems no reason why of necessity boilers should be fixed below the level of all the pipes : we should, of the two, prefer the siphon principle, of course, as being the most compact and most efficient in application, the law of gravitation being antagonistic

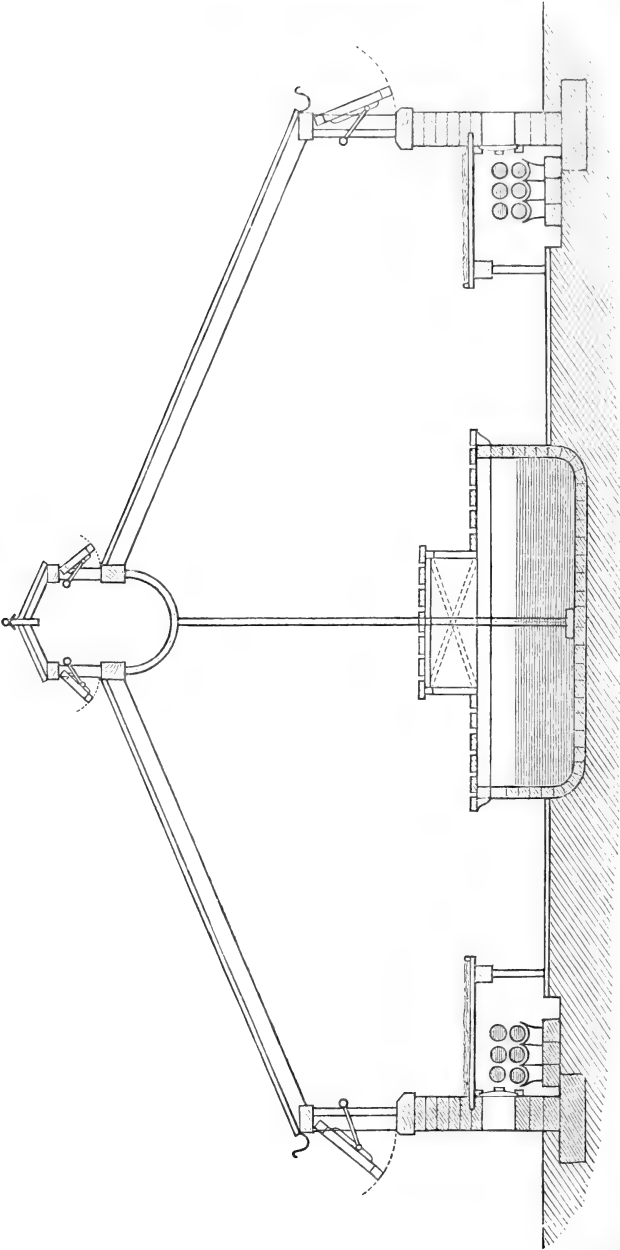
to the other ; but where difficulties of drainage or deep excavation or approach are to be contended against, the lifting principle might be adopted with advantage. It is well understood in an apparatus on the siphon-principle, if any part of the return-pipe dips below the bottom of the boiler, there the coldest water will lie, and act as an effectual plug against the circulation ; but by the use of the perpendicular pipe discharging the heated water at once into an elevated expansion-box, and thence being distributed, there seems no reason why the boiler should not be actually above the level of the return pipes, for by this means the boiler is made simply an enlarged gland or portion of the pipes. It once was our duty to stoke a boiler which was no boiler at all, but only a spiral coil of 4-inch pipes, the return being of course the bottom of the coil. The water, in its course through the various houses and apartments heated, had to pass through many *ups* and *downs*, at one place through a succession of pipes placed vertical and parallel, and connected by siphon-bends top and bottom. The apparatus worked perfectly, but great attention was required that no air should accumulate at any of the bends, as if it did, the circulation was impeded at once. Water was supplied from a ball-tap at a considerable elevation above the highest point of the pipes. Heating by hot water has so generally been carried out on the siphon principle, that public opinion has become settled that there is no other mode whatever. The fact that it is the most convenient, and can be applied in all but very exceptional cases, has had a tendency so to settle the matter ; but we agree with the editor in saying that the whole subject is worthy of discussion, to our mutual gratification and instruction.

THE SQUIRE'S GARDENER.



A PLANT-HOUSE.

To any one about to build, and who wants a really good plant-house, I would suggest one of similar size and construction to that shown in the accompanying section, p. 274. What is worth doing at all is worth doing *well*. There is a general want of room in a great majority of plant-houses. They are very often built too narrow, under the impression that they will cost ever so much less than if they were wider. This, I think, is more imaginary than real, as any one will find out by a little calculation, or by submitting plans of a narrow and wide house for an estimate to any horticultural builder, and compare the extra cost with the extra accommodation. Plants, like animals, require some body of atmosphere to breathe, and if a lot of plants are crowded into a small house, the air will become vitiated in the same way as it would when animal life is shut up. To enclose a good body of atmosphere without having high side-lights and a high-pitched



roof, a considerable width of house is necessary. High side-sashes are objectionable (except for very large specimens), on account of their placing the roof so far from the plants. And I think high-pitched roofs are also objectionable, because in hard weather heat is more apt to be driven from them by the force of the wind than in roofs of a lower pitch. In houses that are too high in proportion to their width, the ventilation in windy weather approaches to something like a *draught* or blast of cold air, which generally makes the atmosphere of the house anything but favourable.

Most gardeners are ready to admit the desirability of a regular temperature being maintained where they have their choice plants; and I am sure there are few men who have not had their patience tried in endeavouring to do this in small houses. They are quickly heated by the sun, and as rapidly cooled by frost and cold winds—span-roofed houses, of course, much more so than lean-to.

Our section represents a house 20 feet wide inside. Opposite the pipes in the side wall are a series of ventilators 18 inches by 9 inches, closed by wooden shutters fitted to slide backward and forward on the inside of the wall, so that they can be used in all weathers. A lath or iron rod can be attached to each shutter, and by means of a level the whole can be opened together. The side sashes and those of the lantern may be worked by the usual rod-and-lever so commonly adopted. A heavy roof like this would require some support, and that might be supplied by iron pillars similar to that represented in our fig. at convenient distances along the centre of the house. The side stages I have represented rather lower than we generally see them. To see a plant to advantage, place it on a low stage, or on the ground. It is quite a mistake, I think, to have plant-stages 2 feet 6 inches or 3 feet high. If the above stages were made 2 feet 6 inches high, the pots would be upon a level with the top of the wall-plate, and so will be continually subjected to the draught from the side lights when these are used, and will therefore be continually getting dry, not so much through what the plant absorbs as through the drying effect of the air (and in many cases through the direct action of the sun) on the pots. If the stage is a foot below the level of the wall, the air will circulate amongst the plants without having that objectionable tendency to dry the soil in which they are growing. To avoid the dry heat from the pipes, the side benches should be covered with an inch of fine gravel or rough sand. Under the centre stage is a convenient place for a tank for rain-water. The pipes shown in plan will be sufficient for a stove.

R. INGLIS.

LILIUM GIGANTEUM.

By far the most stately and handsome both as regards habit of growth and foliage, this noble Indian species is by no means deficient of that rich floral beauty so conspicuous in every member of the tribe to which it belongs.

On its first introduction to British gardens some thirty years ago, it created quite a sensation among horticulturists, and was soon widely distributed over the country. It is now, however, seldom met with in collections—a fact much to be regretted, as few plants are more effective in the midsummer decoration of the conservatory or lofty greenhouse.

Having drooping trumpet-shaped flowers, it is grouped in the Eulirion section of the genus. The stem rises to heights of from six to ten feet, the flowers being clustered at the top: they are of a fine waxy white colour, the interior delicately streaked with violet crimson, and most deliciously fragrant. The fine, broad, heart-shaped leaves at the base of the stem are a foot or more in length, becoming gradually smaller as they ascend: they are bright glossy green, and render the plant very attractive, apart altogether from the flowers. It is nearly hardy, and will withstand the rigours of an ordinary winter in the open border if protected with a mulching of a few inches of leaves or manure. The young foliage, however, is so tender and liable to suffer injury from the cold cutting winds and late frosts of spring, that pot-culture and the wintering of the plants in a cool house or cold frame are the most satisfactory practice, particularly for those that are intended for the conservatory. They are found to thrive well in turfy loam enriched with a liberal allowance of well-rotted stable-manure, with the addition of as much sharp sand and charcoal, not broken too small, as will render the compost sufficiently porous. As the bulbs exhaust themselves in flowering, it is necessary to keep up a supply of succession plants, which are usually obtained in sufficient numbers in the form of offsets from the parent plants for the requirements of even a large establishment. They should be shifted into larger pots from time to time as they gather strength, taking care that the roots are mutilated in the operation as little as possible. Autumn is a very good time for shifting, but some prefer early spring, so soon as the bulbs begin to show their leaves. Such of them as give indications of throwing up flower-stalks should have extra large pots—not less than 12 or 14 inches in diameter. An abundant supply of water is essentially necessary for their wellbeing during the growing season, and they will be much benefited by an occasional supply of weak liquid-manure. No artificial heat is necessary at any stage of their growth. As much air as possible should always be allowed, and the plants should be fully exposed to the sun. HUGH FRASER.

THE FLOWER-GARDEN.

OWING to the exceptionally late and cold season, many gardeners will be unwilling to fill the flower-beds under their charge as early this year as usual. As a matter of fact, most of the subjects planted at the orthodox period would, in most seasons, be all the better of being left out of the ground for a week or two later. The difference in growth and flowering qualities displayed by such things as Verbenas, Lobelias, &c., when planted at a time that they are able to rush away into growth at once, instead of hanging on in a semi-torpid condition until the temperature of earth and air gets warmer, is very marked. We have noticed this repeatedly, and in our own case will so far act on it as to plant nothing except the hardier kinds of bedding-plants before June. Everything up to this date is still under cover; and though it somewhat disarranges one's plans to have houses and pits full of bedding-plants at the middle of May, it would prove more inconvenient and more damaging to turn them out of their shelter before the weather gets warm enough to give them no check. It is somewhat remarkable, considering the long time the present system of flower-gardening has been the fashion, that so little attention is paid to the requirements of the various kinds of plants employed. In the kitchen-garden Cauli-flowers get a very different kind of treatment from Potatoes or Carrots, and the wants of Globe Artichokes or Rhubarb are as different as can be from the requirements of Turnips or of Parsnips—and these varying wants are appreciated and duly acted on by gardeners; but when the flower-beds are turned over, in many cases the treatment is alike for Geraniums and Verbenas, for Calceolarias or Gazania. It is certain that Verbenas and Calceolarias, Lobelias, Violas, and Iresines will not give satisfaction treated year after year like Geraniums. The quantity of manure that Verbenas and Iresines—*Lindeni* especially is kept in view—require to keep them growing, and to keep the former flowering in a vigorous state, is very great. Stable manure is very suitable for these. Lobelias and Violas do best manured from the cow-houses. In addition to a liberal dressing dug into the ground, these may all be treated with advantage to a mulching of mushroom-dung mixed with soot. Iresines should not be planted too quickly,—this is such an effective plant when properly managed that it is worth a little extra care in its cultivation. Two to three thousand plants of *I. Lindeni* are used here every season, and sometimes it is planted in a mixture of half dung and soil, and mulched after planting. *Alternantheras* will be tried this year—a few thousands—also *Coleus Verschaffelti*; but these will not be trusted out till about the end of June at earliest. Both will have a thoroughly good trial; but from former experience we much doubt their succeeding satisfactorily. Watering causes a deal of extra employment to flower-gardeners, which might sometimes, at least, be in a great measure dispensed with. If weather and soil are dry when planting

is being proceeded with, the plants may be put out into their places without filling in the soil level round the plants until after a good watering sufficient to moisten it on all sides, and to a good depth, has been given. In a short time the beds require to be levelled, and if a mulching of rotted manure can be spared at same time, most plants will be in a position to make a start for themselves without further attention. Watering, unless a necessity, is an evil which ought to be avoided. Where carpet-bedding is indulged in, a different *régime* is necessary with regard to applying water. Owing to the closeness that the plants are put to each other, watering in dry weather is a necessity that cannot be avoided without harming the appearance of the beds; but even here no more than is simply requisite should be given. It is during the beginning of the season that water is most necessary here also. Many seedling plants sown in frames in April will be no more than ready now for pricking out into their places: these comprise such good autumn-flowering plants as Asters, Phlox Drummondii, and Marigolds. In dry weather we draw the roots of these through a mixture of soil and water, which keeps the roots fresh until the plants make a start into the soil. Staking all plants as, or before, they require it, in mixed borders, is a necessary portion of the work of the month. The hoe should also be plied now without stint, and all weeds kept down both on beds and walks. All plants required to be kept low should be pinched from the first in order to obtain a bushy growth, so as to do with fewer pinchings later on. Violas and bedding Pansies will require going over, and all seed-capsules and decaying flowers gathered off. This, in addition to a mulching of rotted manure, will go far to keep these in a free-flowering condition. Early-flowering herbaceous plants, if denuded of flower-spikes as these begin to decay, will flower again, in many instances, late in autumn. Annuals over-thick in beds or borders should be immediately thinned out in order to keep them in a floriferous state till late in autumn. R. P. B.



THE AMATEUR'S GARDEN.

SALADS.

(Continued from page 230.)

Lettuces are in demand wherever they can be obtained. Their cultivation is very simple, but the way in which small growers treat them generally is not productive of fine crisp Lettuces. We refer to the practice of sowing them thickly and never thinning them. To grow them well the soil must be rich, otherwise they will fail in the most important quality of a good Lettuce—viz., crisp tenderness. The very earliest are got from sowings made from the middle to the end of August, and transplanted in September, when protection can be afforded them. Cold frames are best for the purpose, and dry light soil on a well-drained bottom is essential. Air ought to be given on all favourable

occasions, as a close damp atmosphere is to be guarded against. The hardiest Cos varieties are generally grown for this purpose, because they stand the winter well. All-the-year-round Cabbage-Lettuce, however, stands the winter very well when justice is done to it while in the frames in the matter of airing, stirring the surface-soil, &c., to maintain as sweet and dry an atmosphere as possible. These plants should be transplanted in March or April on a well-sheltered spot, and if room can be afforded them a few left in the frame will come in a little earlier than the transplanted ones. By the end of February a small sowing should be made under glass, or in the warmest place possible outside. Once a month afterwards a small sowing should be made and the thinnings transplanted, which will furnish as good a succession as if a sowing were made once a fortnight. Allow them 18 inches between the rows, and from 9 inches to 1 foot in the row, according to the variety grown and the state of the soil. A good soaking of sewage or other manure water, and a mulching of rotten manure, give Lettuces quite a different character from those grown thickly on poor soils. Some varieties require tying up to secure the best blanched heads possible, others again do very well without it.

Radishes rank second in the esteem of small growers; and indeed Lettuces, Radishes, and Cress are all the salading grown in most amateurs' gardens. They may be had all the year round when proper appliances exist, and nine months out of the twelve where a cold frame, or a portion of it, can be devoted to their cultivation. Under a frame, more especially if there be a little bottom-heat, a sowing may be made by the end of January, and once a fortnight afterwards. We have often grown them in a common greenhouse in 6-inch pots placed near the glass, and where a little air had access to them when the weather was favourable for airing. In sowing them outside, draw drills the whole width of the hoe, and scatter the seeds thinly in the bottom of the flat drill. Cover to the depth of half an inch, and thin, when up, to 2 inches apart. The way amateurs generally grow them is the way to secure the worst results; for good Radishes cannot be grown when the seed is huddled together in the rows, and the plants allowed to grow in tufts. Rich soil is also an essential in the production of tender, well-flavoured Radishes. Sowings may be made as late as the beginning of October; but for such late sowings a warm sheltered spot should be chosen, and protection by means of hand-lights, &c., afforded if possible. These will come in for use during winter.

Mustard and *Cress* require treatment very similar to Radishes, so we need not repeat the directions. Only, a sowing of each should be made once a week in small patches where there is a little space, and places otherwise vacant can be thus kept under crop. A rich soil and plenty of water in dry weather cause them to grow quickly and tender. Late in autumn and early in spring a supply may be kept up with a few flats and some clear sand or earth in the kitchen-window or other room where there is a little heat.

These are the more generally grown Salads, at least by amateurs; but a paper on Salads would be incomplete were we not to add others which are occasionally grown, and which amateurs may desire to know something of.

Endive is one of these. It is soon enough to sow *Endive* about the middle of July, or even later, up to the end of August. Sow it in the same way as Lettuce, in good rich soil. It will be ready to transplant in about a month afterwards. For this purpose shallow trenches should be thrown out with the spade about 18 inches apart. Plant at 9 or 10 inches apart in the rows, and water plentifully, unless the weather be showery and moist, which is the best condition under which to plant them. A soaking of manure-water will benefit

them greatly. They are of no use unless blanched, and the best means of doing so, on a small scale, is to place flower-pots or boxes over the plants to exclude the light. Allow them to be a good size before doing this. A few only should be covered at a time—the cultivator will soon find out the necessary quantity—and when one is cut the pot should be placed over another, so as to keep up a succession. The later sowings should be treated similarly. If protection can be afforded them to keep off frost and wind, Endive may be enjoyed until far on in winter, when its place may be supplied by

Chicory.—This should be sown and treated like Lettuces, so far as the sowing, thinning, &c., is concerned. One foot between the rows is sufficient, and 4 or 6 inches in the rows. Sow about the beginning of July, and treat the plants liberally, so as to secure as strong roots as possible. Late in September, or early in October, the roots should be lifted and planted in pots or boxes pretty thickly together. Cut the leaves off, but take care not to break the crowns. Keep them shady and moist for a few days, and afterwards place them where they will not get frozen. When wanted, these boxes or pots should be placed wherever there is a little heat, and where light is excluded. A cellar, a warm closet, under the stage, in the greenhouse—anywhere, where there is a little warmth, will secure a nice beautiful Salad in the depth of winter.

Dandelion is blanched in precisely the same way, and may be dug up from the roadside for the purpose. It is best to grow a small bed, however, and any damp out-of-the-way corner will do well. It may be grown from seed as described for Chicory, or plants may be dug up for the purpose of filling a bed. They may also be blanched when they grow, early in spring, by covering them over with boxes or pots and leaves. Chicory may also be blanched in the same way.

American Cress is occasionally grown for Salads. Sow from March till August, at intervals of a month.

Normandy Cress should be sown thinly in March.

Indian Cress is sometimes used in Salads—the flowers being the parts used.

Chives are also sometimes used as a Salad. It is easily grown. They are propagated by division early in spring.

Young Onions are oftener used. To furnish these, fortnightly sowings of common Onions should be made in rich soil.

A GARDENER.



A FEW WORDS ON THE MARÉCHAL NIEL ROSE.

EVERYBODY loves the above Rose ; and few plants make such a good climber for the roof, or for training against a back wall of a greenhouse. It delights in being allowed to ramble away at will ; but for the sake of tidiness it must be kept somewhat trained, by being tied to wires, or to tacks driven into the rafters in the absence of wires. The leading shoots should be allowed, however, to grow on without stopping them during the whole season, and then cut them back, say in January, to whatever length may be desired ; they will then break into growth at every joint, and flower abundantly. Of course, where practicable, they should be planted out in a well-prepared border.

A plan which we mean to adopt in growing this Rose for forcing, and which we think will be a very good one, is to grow it on in

pots, as we do Vines for fruiting in pots, either as single rods or by leading up two or even three shoots from each. They can be grown from cuttings, or, if preferred, may be budded in the ordinary way out of doors, then potted up and brought into some house or pit set apart for the purpose. They would require to be kept trained up to wires, just as we do pot-Vines, and fully exposed to light, but must be allowed to extend their growth without stopping them, else the lateral buds may break into growth prematurely. Where many cut flowers are required, a long succession of blooms might be obtained in this way, by bringing in a few plants every ten days or so to the forcing-pit.

For growing them in this way, cuttings of ripe wood should be put in about the beginning of February in 6-inch pots, well drained, and soil made up of two parts leaf-mould and one part of sharp sand. Put the cuttings in a ring round close to the side of the pots, and plunge them in a gentle bottom-heat: they will soon root, when they must be potted off into 3-inch pots, and placed in a warm house or pit, say in a temperature of about 55°. In the course of two or three weeks they may be shifted into 6-inch pots, and afterwards into 10-inch pots, which latter size is quite large enough for them to flower in. The soil used should consist principally of good loam, with the addition of a little old cow-dung or a sprinkling of bone-meal, with sufficient sand to keep all open and porous. If it is intended to take up more than one shoot, the points should be pinched out when they are about 6 inches high, but afterwards they must be allowed to grow on without pinching. They must be kept in a warm place until May, when they will do very well without fire-heat, if closed early in the afternoon. See that they do not want for water; and a dewing with the syringe at shutting-up time will help to keep them clean. Give plenty of air during the day, as a close stagnant atmosphere tends to produce mildew; should this appear, syringe them at once with sulphur mixed up in a pail of water: it does not look so bad when applied in this way as when dusted on dry, and is quite as effectual in destroying the mildew. I find that under glass, if not allowed to get dry at the roots, the *Maréchal Niel* is not liable to be much troubled with greenfly; but if any should appear, fumigate in the usual way, or syringe with quassia-water. About the beginning of September the plants may with advantage be removed out of doors and tied up against a wall where they will be fully exposed to the sun: this will greatly assist in ripening the wood, as on this being properly done depends the quantity and quality of the flowers which are to follow. The first batch of plants may be put into heat in January, cutting them back to 8 or 10 feet: 50° will be high enough at first, which may be increased to 55°. They will soon break away into growth: when the flower-buds are showing, give an occasional watering with manure-water. We have been led to make these few remarks from the fact that last year we lifted a young plant from outside and planted it against the back wall of a new viney

planted with the Lady Downes Grape. It was about the middle of April when the Rose was planted. It threw out several strong shoots, which were kept tied in, and soon reached the top of the wall (16 feet)—they were then trained along the wires, so that by the end of the season they had made growths of about 30 feet in length. In January these were cut back to about 12 feet, and soon began to burst into growth, every eye throwing from one to three shoots, and all terminating in flower-buds; so that at the present time (May 9th) there are, in every stage of development, on one plant 400 buds, which are regularly distributed over the plant from bottom to top. The plant was green all winter, having never yet cast off the foliage of last year, and shows no signs of doing so—in fact it may be called an evergreen.

J. G., W.



CALADIUM CULTURE.

CALADIUMS are a genus of highly ornamental plants of fine growth, easily cultivated, and requiring a strong moist heat to develop their beauties; they should be grown wherever ornamental and beautifully variegated foliage is admired.

As soon as the bulbs show signs of starting into growth they should be potted into good turfy loam, a little leaf-mould, well-decomposed cow-dung and sand, with a good addition of charcoal and bone meal. In potting, use clean pots, well drained, with a layer of moss over the crocks; fill up the pots fully one-half with a portion of the roughest soil, place the bulbs with a layer of sand at the base of each, and use the largest bulbs for the largest-sized pots, the size of which must be entirely regulated by the size of the specimens required—12 to 18 inches being a good size for show plants or exhibition purposes, and small bulbs in 6-inch pots make good decorative plants—then fill up with some of the finer soil, pressing all gently down with the hand, and leaving plenty of room for water, which must be used very sparingly at first, till the plants throw out roots; and after they progress in size and strength the quantity can be gradually increased. A more vigorous growth can be induced by using guano-water occasionally; but we prefer shifting them into larger-sized pots when they become pot-bound, as the foliage loses part of its rich colour when stimulants are used.

When the sun is very strong they will require to be shaded, and gently syringed on fine days early in the afternoon, in common with the other occupants of the stove. They can also be well grown in a vinery, where room is a consideration, but they never develop their beauties so well under the shade of the Vines. As soon as they begin to fade in the autumn, less water should be given, gradually decreasing the quantity until it is entirely withheld. After growth has stopped, and the bulbs fully matured, the foliage should be all cleared away,

and the pots put under the stage in the stove, or any other place with a cool, moist bottom, so that the roots can absorb a little of the moisture, which will keep the bulbs plump, and prevent the watering-pot being used so often during the time they are at rest. They must not at any time during the resting period be allowed to become dust-dry, or the corms will suffer, if not decay altogether. An early growth may be encouraged by potting early in the season, and plunging the pots in a strong bottom-heat, and maintaining a warm, moist atmosphere.

When any flowers make their appearance on the plants they should be instantly nipped off; and if an increase of stock is required, the bulbs can be divided with a sharp knife into small bits, with an "eye" to each, after growth has commenced.

DUNDONIAN.



NOTES FROM THE PAPERS.

Is not the character of the 'Gardeners' Chronicle' in the matter of "copy" above suspicion? It neither steals from others nor permits its own to be stolen, if it can put in a claim; and it would be absurd to suppose that so learned and expert a body as the editor and staff could be gulled to the extent of having the productions of a well-known author foisted upon them as original! Oh no! The poetry of the 'Chronicle' is "original," and "J. Downie" is its poet! But "J. Downie's" poetical genius is much more manifest in the matter of selection than in that of retouching. It is bad enough to "convey" another man's verses body-bulk; but the offence is tenfold aggravated when the appropriator spoils these verses by his own silly alterations. Still, if Downie and the 'Chronicle' will pardon us parodying their style, we would say—

Wi' his capers naebody can thole,
 For the verses,* ye ken, were just "stole"
 Frae Wingate's sad lay,†
 And the very next day
 The 'Chronicle' printed the whole—
 The whole—

The 'Chronicle' printed the whole!

After this we may be prepared for meeting with any of our old acquaintances in the "Original Poetry" corner of the 'Chronicle,' and it would not surprise us to hear that the editor has accepted Shelley's "Sensitive Plant," or Burns's "Wee, modest, crimson-tippit flow'r," from the pen of its gifted correspondent.

* "Jack Frost" in 'The Gardener's Chronicle,' April 19th, 1879.

† 'Annie Weir, and other Poems.' By David Wingate. William Blackwood & Sons, Edinburgh and London: 1866.

The past long and severe winter, and the prolonged low temperature of the spring, also now gone, continue to excite unusual comment. Even people whose occupations do not lead them to take so much interest in the weather as gardeners and farmers are beginning to be disquieted at the weird aspect of the season. Summer is here, and yet vegetation is almost as completely at rest as it was at midwinter, and snow and frost have prevailed in many places. Farmers are unprecedentedly late in getting their spring crops in, and fear that now these will not ripen unless the few remaining months during which we can expect any real warmth are unusually favourable. As an indication of the continued low state of the temperature during the last eight or nine months, we were the other day shown some Cauliflower plants that were sown last August, and in September pricked out into a frame, where they had remained until the beginning of the present month of May without having made any perceptible growth during a period of seven months. The plants were not more than 3 inches high! Let us not meet our troubles half-way, however, but hope that we shall have both seed-time and harvest as usual.

Can the collective ingenuity of the Scottish Horticultural Association suggest nothing better—nothing more likely to promote the interests of horticulture—than a competition for the best “kitchen-garden plan,” a subject which we thought had been pretty well settled? A vegetable-garden can very often all be a square plot, and the chief difficulty of the designer lies in contriving the best way of getting round the same with a wheelbarrow. This the successful winners of the Society’s prize have managed to show can be done, by adhering to the old style adopted in every kitchen-garden in the kingdom, down to the cottager’s allotment; and it will be no doubt pleasing to them to be told by “a competent garden architect” that “they have each adopted the form best adapted for a kitchen-garden.” Let it be understood, however, that we do not find fault with the clever-going gardeners who drew the plans—they could only operate on the lines set out for them by the S. H. A., and they have shown their good sense and judgment by adhering to the old style, which, indeed, they could not well have improved upon. There is, however, a partial revolution going on in kitchen-gardening itself that might have been opportunely taken notice of, and that is the system of keeping the fruit and vegetable gardens distinct. In these days, when gentlemen can buy many kinds of fruits and vegetables almost cheaper than they can produce them at home, the subject of remunerative kitchen-gardening is attracting a good deal more attention, and gardeners are finding out that their success is now measured by the marketable value of their productions a great deal more than it used to be; and consequently the question how to lay out and crop a kitchen-garden to the best advantage is the one concerning which gardeners have need to learn most at the present time, and we commend the subject to the attention of those who wish to encourage horticulture in the way indicated by the Scottish Horticultural Association. We have said that no great alterations are suggested in the formation of the vegetable quarters of a garden; but how to reduce the extent and labour of keeping garden walks and borders—how to keep the orchard and vegetable departments separate with advantage to both—and above all, how to utilise necessary or existing garden-walls, by covering them with glass instead of erecting independent glass structures in another part of the ground, and at great and extra expense, for a similar purpose,—are questions which those who aspire to teach us anything on the subject should study. In this respect our enterprising horticultural builders are ahead of gardeners them-

selves, and suggestions have been already offered on the subject by the editor of this paper.

A correspondent of one of the daily papers in the provinces writes as follows on the subject of dishonest proceedings at flower-shows: "I can speak from a good deal of experience, and can truly affirm that the days of horticultural shows are numbered, unless nefarious practices are put a stop to. Exhibitors who are honest are disgusted at being deprived of what they have honestly won, and subscribers are in many instances declining to patronise or connect themselves with what they rightly deem a disgrace to the place. I could enlarge this letter considerably by giving numerous instances of the variety of frauds practised, but as they are generally known I scarcely think it necessary. If, however, committees having the management and appropriation of money subscribed for the encouragement or improvement of cottage-gardening would take such measures as will prove of use in putting a stop to the evil, they will merit the approval of every one, and will succeed in raising floral exhibitions from the slough of despond into which they are fast falling to a state in which they will be what they are designed to be—a great and lasting benefit to the public."

These remarks allude to certain revelations that had been made concerning fraudulent practices at flower-shows, and now quite common, it would appear, and practised with impunity.

A correspondent of 'Gardening Illustrated' says: "The Sunflower is a most valuable sanitary agent. This I proved to my entire satisfaction whilst living in the environs of an eastern city of the United States, where bad drainage and a hot sun—aggravated by the habits of a population ignorant of all hygienic law—aroused me to the necessity of some safeguard. This was the Sunflower (*Helianthus*), started early in pots and planted out when half a foot high. They soon formed a grove in the very stiff clay soil of which your correspondent of No. 4 complains. Jerusalem Artichokes, as a vegetable, will do for him what these Sunflowers did for me. In a year or two, with generous manuring, they will change yellow clay into a moderately light soil of a darker hue. My family, and those of two immediate neighbouring cottages, were the only ones that escaped unscathed from the smallpox epidemic. Chicken cholera also raged around and cleared entire hen-roosts. Mine was untouched by it. The stems of those Sunflowers which bordered the garden I utilised by trimming off all leaves and laterals for bean stalks and supports for climbing-flowers. The seeds, of which I had several bushels, served to fatten my fowls. They ate it when they refused the more usual fare of maize. The stems, when dry, I burnt for potash. No other vegetable matter contains so much of this (to the gardener) valuable alkali."

The following plan from the 'Journal of Horticulture' of fumigating hot-houses is, we think, worth mentioning. The plan is simple, convenient, and effective, apparently:—

"FUMIGATING.—I beg to submit to your smoke-poisoned inquirer 'S.A.Y.,' page 247, an easy and cheap method of fumigating in safety. Have a 6-inch flower-pot resting on an old gridiron, or two or three pieces of iron rod, on the top of two herring boxes or bricks the height you want, leaving space between for a candlestick, and place your apparatus near the door; fill the pot with tobacco-paper torn in pieces half the size of your hand, do not press it too firmly, place a lighted candle close to the hole in the pot, and the work is done for a house 14 feet by 12. You can open the door to take out the candle, or you can leave it to burn out."

A horticultural writer in a provincial paper says that at Stevens's Rooms, the

other day, plants of "*Odontoglossum maxillarium* and *O. Alexandræ* were pointed out to him which had been potted in common garden earth, just as a cottager would pot a *Fuchsia* for his window. These had been grown among other plants in a hothouse, and had made bulbs larger than those of the previous year." It may be mentioned that we have seen thousands of the *Odontoglossum* roots—chiefly *O. Alexandræ*, *gloriosa*, *triumphans*, and others—just as they came out of the ship and as they had been gathered, and we have often thought, from the *débris* still adhering to the roots, that the plants did not look as if they had been grown in such a compost as sphagnum, but in stones and soil, kept moist probably by copious rainfalls during their season of growth. Some of the plants had dead flower-stems on them, that must, when plump and fresh, have been as round and plump as one's finger, and some feet in height, the stump left being some 9 inches long. There is nothing to complain of in the success attained by our hothouse methods of culture, but if such plants can be grown successfully in common garden soil, it will simplify their culture to some extent. While on this subject, we notice that your old and valued correspondent, Mr F. W. Burbidge, is contributing an account of his experiences as a collector of Orchids to one of your contemporaries. Would that plant-collectors had sooner begun to tell us of the conditions under which the plants they sent home were found growing naturally. Thousands and thousands of plants have been sent home from time to time simply to be killed, because the necessary information as to their habits and conditions of existence did not accompany them. The reticence of collectors on this head has hitherto been wholly inexplicable.

READER.

GARRYA ELLIPTICA.

ABOUT a year ago a correspondence was carried on in the pages of a contemporary regarding the hardiness of this well-known shrub, which was disputed by some of the writers. Looking at its adaptation for general planting from a climatic point of view, it appears to thrive well under very different conditions in this respect. When on a visit to Ardmillan Gardens about the middle of March, two fine specimens were brought under my notice which were loaded with half-developed flowers. Being interested to see such fine specimens of this favourite shrub, I took the liberty of stepping round them for the purpose of getting some idea of their dimensions, and calculated the circumference of each plant at about 25 yards. I thought it a pity to see such fine plants maltreated to such an extent with the knife, as they presented almost a hedge-like appearance.

In your April number Mr Garret informs us of a plant of *Garrya elliptica* at Whittinghame of nearly the same dimensions as those I have referred to, also doing well. As the difference of the mean temperature on the coast of south Ayrshire, where Ardmillan is situated, and that of East Lothian, is considerable, particularly in winter, it may reasonably be inferred that whatever be the conditions unfavourable to success in the cultivation of the shrub in question, climate is not a matter of so much importance as may often be attached to it.

D. MACKIE.

THYRSACANTHUS RUTILANS.

THIS old but most useful flowering plant, with its long drooping spikes of scarlet flowers, which it produces in the dark days of winter, is worthy of more attention, and should be grown on a larger scale than it is in many places. Where such plants are appreciated for table decoration, the *Thyrsacanthus*, when well grown, is an admirable plant for the purpose, or for the ornamentation of a warm conservatory, or any plant-house where there is a little warmth in winter.

We too frequently find in many places a straggling half-starved specimen amongst a collection of mixed stove-plants subjected to a too high temperature, in which, with its two or three small leaves on its top, it struggles hard to exist. Under such conditions it becomes a prey to insects, and the cultivator takes a dislike to it and discontinues growing it. When well grown it is a charming plant, and a striking object in whatever position it is placed.

To grow the plant well, cuttings should be inserted in small pots during April and May—the latter month is not too late. They root very soon in a moderate heat in the propagating frame. They should be shaded from strong sun until rooted. When the cuttings are rooted they should be transferred into 4-inch pots, using a compost of loam and sand, and a seventh of well-decomposed manure, and should be in a temperature of 55° by night; and when well established they should be gradually hardened off and placed in a cool frame or house; and when the pots are full of roots they should be transferred into 6-inch pots. This size is large enough either for table decoration or for the plant-houses. Care must be taken that the plants do not become pot-bound before receiving their final shift, for they are very apt to show flower too early.

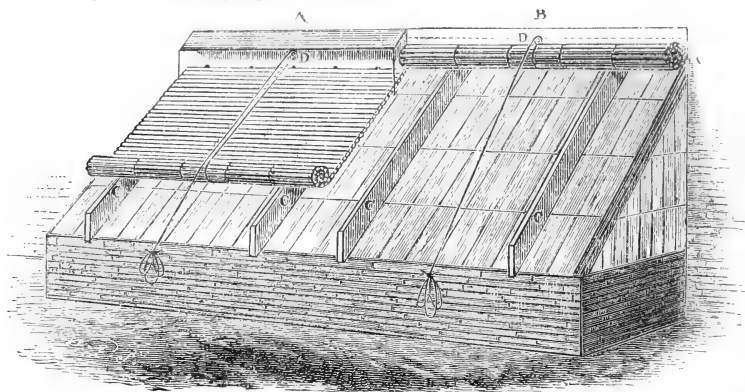
After the 6-inch pots are full of roots they should be liberally supplied with manure-water, and occasional applications of soot-water have a very stimulating effect upon the plants. Those required for table decoration should be stopped two or three times during the season, to make them dwarf bushy plants: the remaining portion of the stock are best not stopped. When the nights begin to be cold in September the plants should be removed where a temperature of 50° to 55° can be maintained. Under this cool system of treatment they will not be infested with insects, and they will be furnished with healthy leaves to the bottom; and during the winter they will be very ornamental, and well repay for the little trouble bestowed on them.

A GROWER.



THE NEW BAMBOO SHADING.

THE New Plant and Bulb Company, of Lion Walk, Colchester, have sent us the accompanying illustration and description of a new shading for hothouses which they have brought out. We think very highly of it, especially for moderate-sized houses and pits. The arrangement of having the shading elevated a foot above the glass is a step in the right direction for the purpose of keeping down the heat of houses in summer, for so fixed it does so more effectively than when lying on the glass.



In A compartment—the Bamboo Mat partially unrolled, with box at top complete for its protection—the mode of rolling up—the staples, at the bottom of the box inside, to which the upper edge of the mat is attached by stout twine—are shown.

In B compartment—the cover of the box has been removed to show the mat rolled up when not in use.

CC are the bearers upon which the mat is supported, 10 to 12 inches above the level of the glass.

DD, the screw pulleys round which the cords run to pull up the mat.

To let down the shading, loosen the cords which have been fastened to the hooks placed in the front wall below the glass, the mats will fall down by their own weight. In rolling up again, see that the cord hangs straight down the middle of the mat, then pull up steadily and fasten.

The mats are fastened above to five or six staples, firmly driven in at the bottom of the box cover inside, by tying to them the thick bamboo at end of mat with strong twine.

It is as well to have a wooden roller tied by string to the lower end of the mat, to make it roll up more easily.



SCOTTISH HORTICULTURAL ASSOCIATION.

THE monthly meeting was held on the evening of Tuesday the 6th ult.—Mr M. Dunn presiding. Mr A. D. Makenzie read a paper on “Economy of fuel in heating greenhouses with hot water,” in which he reviewed the claims and capabilities of the various boilers which had been patented and recommended by practical men, and gave as his opinion, founded upon careful and extended

observation, that no boiler had as yet been invented at once so powerful and so economical as that well known as the horizontal flued saddle. A communication was read from Mr Arch. Fowler, Castle Kennedy, on the "Setting of Grapes," giving his experience of some of the shy-setting varieties, and recommending the shaking or tapping of the stems while the flowers were expanded, with the view of scattering the pollen, so that each of the stigmas might receive a sufficient quantity for fertilisation. Mr George M'Clure, The Gardens, Trinity Grove, next read a paper on the "Cyclamen," in the culture of which he had been remarkably successful. For soil, he recommended a mixture of good loam and leaf-mould, enriched with well-decomposed manure, with the addition of a sufficient quantity of sharp sand to render it porous. During the growing season the plants should have a light airy situation, and care should always be taken to give them an abundant supply of water. When the leaves were decayed and the bulbs in a state of rest, less water was necessary, but they should never be allowed to become completely dry. Mr Alexander Macmillan, Broadmeadows, sent a communication on "Zonale Pelargoniums," in which he gave some details of his experience of them as winter-blooming plants. His practice was to plant them out in a border of rich soil in the greenhouse, where they flowered with the utmost profusion. Each of the papers was freely criticised, and on the motion of the chairman, votes of thanks were cordially awarded to the authors.

On the recommendation of the Council, the meeting agreed to offer prizes of £3, £2, and £1 to under-gardeners members of the Association, for the three best herbariums of British plants collected between May 1879 and February 1880.

Among the subjects tabled for exhibition we noted a collection of seedling Alpine Auriculas, of very superior quality, from Mr M'Clure, one of which, named "Colonel Wood," it was reported, had been awarded a first-class certificate by the new-flowers committee. Mr James Hunter, Lambton Castle, sent a basket of *Valeriana Phu-aurea*, a hardy herbaceous plant used at Lambton for spring bedding. It seems strange that this fine old golden-leaved plant has been so long overlooked for this purpose. Mr Robertson Munro had a small but very select lot of Alpine plants. Messrs Dicksons & Co. sent a miscellaneous collection, including well-flowered specimens of *Forsythia Fortunei*, a hardy Japanese shrub covered with its golden blossoms; *Rhododendron Broughtmanii aurea*, a yellow-flowered cross between a *Rhododendron* and *Azalea sinensis*; *Valeriana Phu-aurea*; a number of fine-flowered seedlings of *Primula denticulata*, with various shades of colour. These had been grown in the open air, and when seen in the borders must have been very effective. Mr Thomas J. Ware, Tottenham, London, sent a number of blooms of early forcing Pinks, which were admired for their brilliant colours. Messrs Ireland & Thomson had a number of very interesting and showy *Amaryllis* blooms; Messrs Downie & Laird, a stand of a superior strain of *Mimulus*; and Mr M'Leod, Royal Blind Asylum, blooms of *Petunias*.

We would again urge upon the Council the importance of making some provision for inspecting the exhibits sent from month to month to the meeting. On this occasion it was next to impossible for one-half of the members present to get even a glance at a part of them, huddled together as they were on a table not half large enough to show them to advantage, and many of them without either labels or exhibitors' names attached. Could a separate room not be got for this purpose, so that members and visitors might leisurely examine them? Certain we are that they are second to none of the matters of interest brought before the Association.

Obituary Notice.

WE regret to have to announce the death of Robert Miln, Esq., at his seat near Arbroath, on the 13th inst., at the age of 84. Mr Miln was a liberal patron of horticulture, and had a passionate love for Orchids. His collection contains many fine specimens, especially of cool Orchids. Amongst hot Orchids, his plants of *Phalænopsis Schilleriana* have long been famous, having gained awards in London and Edinburgh: in the latter town he showed a grand specimen of this noble Orchid at the last spring show, and it was the admiration of all who saw it.

Mr Miln was greatly respected by all who had the pleasure of his acquaintance, for the kindness of his heart as well as for the clearness of his judgment. His extensive collection of Orchids will, it is to be feared, be dispersed.



Calendar.

KITCHEN - GARDEN.

UP to the middle of May we hear of great difficulty in raising seedlings in kitchen-gardens. The long continued frosty weather and cold easterly winds are trying in the extreme. While we write there is little improvement on the past weather. Copious rain has fallen, and is succeeded by north-east winds unusually severe. On the 10th May we had 8° of frost; in some low-lying places near this they had 12°. Under such circumstances, the difficulties we hear so much of are not inventions, but stern realities. Those who have cold pits and frames at command to raise their Brassicas, &c., are safe; and we think, considering the trouble with birds, slugs, &c., it is the cheapest method of raising seedlings. Portable frames and plant-protectors, such as Bolton's, Clarke's, and others, are perhaps the most useful and serviceable. We have, on borders and sheltered places this season, done much with squares formed with bricks—others formed with slabs on edge—on which are placed old lights, thin mats, and other makeshifts; but frames made shallow, light and easily removed from one position to the other, as crops may require them, are the best and cheapest in the end. In some places in our locality, where new Potatoes have often been dug by the end of May, or early in June, they have not come through the ground yet. Some we had under shelter of walls have been cut down to the surface, and we fear are

now worthless. Brocoli, which we were considered fortunate in saving (about 100 out of 2000), are not likely to be of much service. Kale Sprouts and Savoy Sprouts are the most serviceable items we have. Out of about 1000 Brown Cos Lettuce and Batavian Endive (both now of great value) we have lost none. They were sheltered from north and east, and planted on thoroughly trenched ground, with bottom left very rough for drainage. There is much more in these amenities, while preparation for crops is being made, than some believe. Artichokes (Globe) are in many places killed. Where young sprouts from the roots can be had, they should be taken off with a heel and planted (in rich ground well broken) about 3 feet between the plants. A sowing of Peas and Beans should be made about the first to middle of this month in northern and late localities, and from the middle to the end of month in warmer and more southern districts. Early kinds are best for late sowings in districts where soil is deep and cool. Peas are often had from late sowings of the later kinds till frost takes them. Veitch's Perfection and Ne Plus Ultra we have had fine till October in such positions. They were sown in May, and topped to make them branch out. French Beans may be sown to the middle or end of June; and where frosts are early, they could be protected with frames. Hoops and mats are also use-

ful in autumn, but cold rains kept off is of great moment in prolonging the crop. Borecole of all kinds, Broccoli, Cabbage, Cauliflower, Savoys, Brussels Sprouts, and every variety of the Brassica family, will require attention this month by pricking out the plants in nursery beds to become strong, or planting out those already prepared permanently. Ground which has been under good manipulation during previous years, and now made thoroughly firm for plants which have to stand the winter (especially when such a season as the past has to be encountered), will give a greater amount of safety to the crops. Those who plant with crowbar may be called lazy gardeners (they, in my opinion, are the reverse, as it is a formidable piece of work to plant in this way), but as far as my observations go, they may also be termed successful cultivators. All who have had experience with this system know that short, strong growth is made—much firmer than loose rich soil produces. Plenty of room for winter crops is of great moment in securing hardiness. Cauliflower and Cabbage to give supplies during summer and autumn can hardly have too rich soil, and it may be trenched as required. The same applies to Lettuce, which may now be sown on very rich soil where it is to grow for use. Sowing thinly and planting the best of the thinnings answers well. Celery should be pricked out for late supplies: a few inches of solid manure, placed on a firm surface, and a little fine soil in which to plant the seedlings, is the usual practice, and I think the best for ordinary gardens. Large market-gardens cannot afford time and labour for this system of Celery raising. Plants ready may be planted out in the ridges prepared for them—whether in wide ridges to hold three or four rows, or single and double rows: in each case plenty of solid manure should be allowed. We have found Red Celery do best this season, and stand the frost better than the White. Dandelion and Chicory should be sown, if not already done; also Endive of sorts where it is required early. The latter should have a cool shady position: it is apt to run to seed when thus early sown. Onions for salads should be sown frequently where they are used for this purpose.

The main crops of Onions require

proper thinning before they become thickly matted and drawn; cleaning and surface-stirring is of much importance. While they are in their early stages of growth, dustings of soot and guano during showery weather is a capital stimulant, and helps to produce large finely-formed Onions. Some are under the impression that large Onions will not keep well: our experience is the reverse. Large finely-formed Onions, with collars small like cord, bulbs 13 inches to 16 inches in circumference, are useful, and keep well to May. Turnips should be sown every ten or twelve days at this season, in small quantities to keep a regular supply; and avoid the necessity of sending to table tough and bitter roots, which is the case when they are allowed to become old and stand long on the ground. Especially if the soil is dry and in a hot position, thin all such crops in their early stages: sowing thickly is a great evil, and one which drives the spindling crop early to seed. Dustings of quicklime, fine ashes, and soot do much to prevent the destruction of the young plants. Radishes require similar treatment; and before sowing the seed during dry hot weather, give a good soaking to the soil the night before the seed is cast into the ground. The thinning of Parsley beds and Parsnips requires special attention: those who do not thin, I fear will not have many to imitate them among the more advanced school of cultivators. Where vermin (such as wireworm) do the thinning, it is a different thing. Some very old gardeners we know do not thin their Parsley, but their name is certainly not "legion." The thinnings of Parsley, planted on a border sheltered and free from damp, will give capital supplies during winter; and a few lights or other simple protection to save labour and trouble during severe frost and snow are worth their room. Potatoes may now require a free use of prong or hoe, but it is well to be cautious not to tear up the young rootlets, as some do in their energy to "hoe and earth up:" where the shaws are very thick it is well to thin them. Light and air into the soil is an important matter when the flavour is a desideratum. Spinach should be sown in shaded and cool, deeply-worked, and highly-manured land: it should be thinned in time, or the

plants will "run" and become useless. When sown between such crops as Cauliflowers and Cabbage, the plants are used before their room is required. New Zealand Spinach is useful when grown on rich land and plenty of room afforded. Tomatoes may now be planted against walls, on back walls of pits, and in frames. There are not many places in the south even where they plant in the open fields. Those fruited in pots in rich soil and allowed to root through the bottoms are fine fruit-bearing plants. When

plenty of fruit are set, give abundance of liquid-manure, and have all useless growths taken off before they get to any size. Cucumbers, Gherkins, and Vegetable Marrows may now be planted—first under protection of glass, and afterwards allowed to run over the open ground; always watering them with tepid soft water, stopping the shoots above the fruit, thinning in time, and not over-cropping the plants. Chillies may be planted in frames. Keep all surfaces clean and well hoed.

M. T.

FORCING DEPARTMENT.

Pines.—Plants intended to supply ripe fruit in autumn should start by the end of this month. If they have been kept cool and dry, as directed last month, and are in moderate-sized pots, there is generally not much difficulty in getting them to show fruit by subjecting them to increased top and bottom heat. Give them sufficient water to well moisten the whole soil, and raise the bottom-heat to about 90° and the air temperature to 75° at 10 P.M., allowing it to sink to 70° by 6 A.M. Any of the plants that show a tendency to grow instead of fruiting after the first good watering, should be kept dry for a time. The set of Smooth Cayennes intended to start in July, and that have been growing freely, should be kept cooler and drier all through this month. Keep a moist atmosphere with a high temperature from sun-heat where Pines are now swelling off. Keep them steadily moist at the root, and give clear, weak manure-water or guano every time they are watered. Syringe the plants every hot day when the house is shut up, allowing the heat to run up to 90° or 95° for a time. Early Queens will be ripe in the course of this month; and as soon as they begin to colour, gradually decrease the moisture in the air and lower the temperature a few degrees, and give air more freely on all fine days, in order to bring up the flavour to the highest point. Give them as much water at the root as will keep the plants fresh and active. The drying-off system in the case of Pines ripening in the heat of summer is a mistake. If more fruits ripen at once than are required, remove a portion of them, plants and all, to a cool, airy, and partially shaded place—such as ainery

where the Grapes are just ripe. Under such conditions the fruits keep fresh a few weeks. Give every attention to plants that were shifted into their fruiting-pots in spring. These are now growing rapidly. Shut up with sun-heat so that the temperature stands for a time at 85°, and start the fires in time to prevent it falling below 75° at 9 P.M. and 70° in the morning. Give a little air in the morning when the heat rises above 75°, gradually increasing it till noon, after which decrease it in the same way. They may be lightly syringed overhead every hot day when shut up. Attend carefully to the watering, and keep the soil moist but not wet, and give weak guano-water every time they require watering. The use of fire-heat will now be at its minimum, and the less that is necessary to keep up the temperature for Pines in all stages the better.

Vines.—Keep all Vines from which the crop has been gathered as cool as possible. Syringe the foliage occasionally to keep it clean and healthy, until it has done its work sufficiently to leave the Vines in a good state for another season's crop. Leave a mulching on both outside and inside borders, to prevent them from becoming too dry and cracking. All ripe Grapes should be kept cool and dry by leaving top and bottom air on all night. Remove all fresh lateral growths immediately they appear from all early Vines, so as to concentrate the energies of the Vines in perfecting the fruit-bearing buds for next season. Give more air to Grapes that have just begun to colour, and lessen the air-moisture by degrees. Examine the borders as soon as colouring begins, and if at all dry,

give a good soaking of water; and if the borders are not mulched, let a thin covering of manure be laid on to prevent evaporation, and nourish the Vines in the heat of summer. Vines that are swelling-off their crops should be liberally supplied with water if the weather be dry and warm. Shut them up early with sun-heat, rising to 85° or 90°. Put on a little air for the night between 6 and 7 P.M., and use no more fire than is necessary to prevent the heat in Muscat-houses from falling below 75°, and other varieties 70°, as a minimum for the night. Should red-spider make its appearance, attack it immediately by hand sponging; or where the water is quite clean, the syringe may be used. Want of sufficient water at the root and insufficient ventilation are conditions which favour red-spider, and these conditions must be avoided. Late crops now being thinned should be more freely thinned than Grapes that are to be cut before winter. And as Grapes swell very rapidly at this season, attend to thinning both bunches and berries immediately they are the size of Radish-seeds, except shy-setting sorts, which should be left unthinned until it can be seen which are the properly fertilised berries. Attend regularly to the pinching of all lateral growths immediately they appear. Vines planted this spring will now be getting a good hold of the border and growing rapidly. Tie them to the wires as they grow, and allow those that are to be cut down for permanent Vines to make as much foliage as there is room for without crowding. Temporary Vines to be cropped next year should have the laterals stopped at the second joint. If pot-Vines have not been already shifted into their fruiting-pots, let them be attended to at once. Place them in a light position near the glass, and encourage them by every possible means to grow freely, stopping them when 6 or 7 feet long.

Peaches.—Keep Peaches that are ripe and ripening well ventilated; and if any of the fruits are shaded with leaves, push them aside so that sun and air can play freely about them. When the early crops are all gathered give the trees a good washing with the engine; and if there is any red-spider on the foliage, mix a handful of flowers of sulphur with the water. Give inside borders a good

soaking of water as soon as the crop is all gathered. Look over the trees and remove at once any shoots that are causing a crowd of foliage. Supply trees that are swelling-off their crop abundantly with water, in cases where the borders are inside. Syringe the trees every fine afternoon when the house is shut up, with sun-heat at 80° for a time, and do not let it sink below 65° by morning. Thin the fruit and tie in the shoots in later houses. Keep green-fly down in the latest cool houses by fumigation with tobacco or syringing with Simpson's Wash. Young trees planted this season will now be growing freely; keep them neatly tied in to their trellis, and pinch the points out of any strong-growing shoots that are getting ahead of the others.

Figs.—Where the crop is ripening, keep the air drier, and ventilate more freely to insure good flavour. As soon as the first crop is gathered from old and fruitful trees, give the border a fresh mulching of good manure, and water freely to encourage the second crop now showing on the young wood. Where there is a fruit at the axil of every leaf, some of them should be thinned off, or they will be deficient in size and the trees will be overtaxed. The earliest plants in pots now swelling-off their second crops should be liberally supplied with liquid manure. An occasional dusting with Standen's Manure will help them. Figs luxuriate in a warm, moist atmosphere, and except when the fruit are ripening, should be freely syringed every afternoon at shutting-up time.

Melons.—Expose ripening fruit to all the sun possible, and ventilate freely. If the weather be bright, do not let the plants become too dry at the root. The soil should at this season be moderately moist till the crop is perfected. Sprinkle advancing crops on fine afternoons. Mulch the surface of the borders in Melon-houses with rotten dung, to prevent evaporation and the necessity for frequent waterings. Stop the lateral growths of later crops one joint beyond the fruit. Impregnate those in bloom, and plant out more plants to ripen their crops in August. Sow more seeds for later crops. A heavy loam is best for summer crops of Melons, and it should be beaten firmly in forming the bed.

Cucumbers.—Now is a good time to plant out a number of plants in cold

pits or frames for bearing up to the end of September. This, however, applies to the south, for in Scotland Cucumbers rarely do much good in cold frames. Top-dress those plants that have been in bearing for some time with rotten manure and loam, and water occasionally with liquid manure. Do not let those now in full bearing carry too heavy a crop at one time, or they will exhaust themselves. Cut off all deformed Cucumbers, stop the young growths at every joint, and keep thrips and red-spider down by the use of the syringe and tobacco-smoke.

Strawberries in Pots.—Those now ripening their crop will do better in a cold pit with sun-heat than on shelves in forcing-houses. They will want copious supplies of water and plenty of air when colouring. Plant out all plants from which the crop is gathered on rich and deeply-worked ground. Immediately runners can be had for layering, get the necessary stock for next year's forcing layered either in 3-inch pots in rich soil, or place the soil between the Roses and lay the plants on it. For early forcing, the plants should be shifted into their fruiting-pits early in July.



Notices to Correspondents.

All business communications and all Advertisements should be addressed to the Publishers, and communications for insertion in 'The Gardener' to David Thomson, Drumlanrig Gardens, Thornhill, Dumfriesshire. It will further oblige if all matter intended for publication, and questions to be replied to, be received by the 14th of the month, and written on *one side* of the paper only. It is also requested that writers forward their name and address, not for publication unless they wish it, but for the sake of that mutual confidence which should exist between the Editor and those who address him. We decline noticing *any* communication which is not accompanied with name and address of writer.

AN OLD SUBSCRIBER.—Without more particulars we cannot exactly tell you why your Vines break irregularly. Vines that are started in too high a temperature are very apt to break irregularly; and we have known applications made in winter for the destruction of insects injure the buds, and so cause an irregular break. But Vines pruned on the spur system seldom break as yours have done, if in ordinary good condition. We also suspect your *Laurus-tinus* has been subjected to a too high temperature. If well established in properly drained pots, and forced in a temperature a little above that of an ordinary greenhouse, the blooms will not drop prematurely.

T. F.—Remove the surface of your Vine-border till you come to the roots, and put over them 7 or 8 inches of rotten farmyard manure and loam in equal proportions. You may apply the manure-water as well, at intervals, in the heat of summer. This, all other things being equal, will stimulate and improve the Vine.

THE GARDENER

JULY 1879.



EARLY-RIPENING VARIETIES OF FRUITS, AND HALES'S EARLY PEACH IN PARTICULAR.



HERE there is a demand for ripe fruits as early in the year as it is possible to have them, it is of the greatest importance to make such selections of Pines, Grapes, Peaches, Nectarines, Strawberries, &c., as not only bear forcing well by artificial means from midwinter onwards, but which also come the most rapidly to a state of ripeness. In both these respects there are very marked differences in the different varieties of these fruits. No experienced forcer who wanted to present new Grapes at table in April or May would select for this purpose the Muscat of Alexandria, although it has probably more good qualities than any other white or even black Grape. Nor would the Barrington or late Admirable Peaches be selected, though these are noble varieties in their proper place. Of Strawberries, no one would select British Queen for ripening early in March, although it is probably yet the finest late or midseason Strawberry in existence. In their respective classes these are all first-class fruits, but they are totally unfitted for very early forcing.

Among Grapes, Black Hamburg has yet no rival for early forcing as a black variety; Buckland Sweetwater and Foster's Seedling are popular white sorts for early work, and no doubt they bear forcing well and ripen early; but it seems strange that such very superior flavoured Grapes as the white and grizzly Frontignacs are so seldom met with in early vineries. They are both Grapes that stand forcing remarkably well, are sure croppers, and come early to maturity. Indeed for our own choice we much prefer Royal Muscadine, and one or two other varieties of Muscadine, for flavour, to either Buckland's

Sweetwater or Foster's Seedling. Where mere appearance is appreciated in preference to flavour, the two last-named may perhaps be preferable.

The popular early forcing Peaches have been, and are still to a great extent, Royal George, Abec, Early York, Stirling Castle, &c. No doubt these varieties have answered the purpose of early forcers well, and they are good when ripe, and until recently have been found among the quickest to arrive at a state of maturity. They are now, however, completely out-distanced for earliness by such varieties as Early Louisa, Early Beatrice, Hales's Early, and Early Rivers. But we fear the two first-named are too small ever to become so acceptable as they otherwise would be. Hales's Early is a large, fine-flavoured, handsome Peach. On these points there cannot be objections raised against it. Its earliness is very remarkable. We have before us a ripe handsome fruit of it from a Peach-house at Chatsworth. From the warmest end of the same house we have, for comparison, a fruit of Elruge Nectarine, and from the middle tree of the house, a fruit of Royal George Peach. The difference is more remarkable than in any similar comparison we have ever seen. Neither the Peach nor Nectarine from the warmest end of the house have finished the stoning period, while Hales's Early Peach is perfectly ripe, juicy, and luscious. The valuable qualities of Hales's Early Peach for early forcing and ripening is thus most strikingly manifested, as against one of the most popular early Peaches of the older class. We believe that Early Rivers is a Peach equally early, rich in flavour, and of large size. There can be no doubt that, whatever may be the fate of the lesser-sized early Peaches, Early Rivers and Hales's Early will take a prominent position in the supply of early Peaches.

What is now wanted to match these two early Peaches is a Nectarine that will ripen nearly about the same time. For long Elruge Nectarine has held a first position as a fine forcing variety, and most deservedly so. It is a fine high-coloured sort, and a sure cropper. Hunt's Tawny is, of course, an earlier but not so good a Nectarine otherwise. It strikes us from what we have seen of Lord Napier that it must ultimately take a high position as an early Nectarine. It ripens about a fortnight before Hunt's Tawny, and (Lord Napier) is perhaps the largest Nectarine in existence, and is excellent in quality; but how it will stand forcing from the end of November onwards through the winter has not, so far as we are aware, been yet well tested. As a midseason fruit it is one of the most free, and it is reasonable to suppose that it will also succeed for winter forcing.

In all seasons early ripening varieties of fruits are of much importance, and they have perhaps never been more so than this year, when early forcing has been found more of an uphill business than perhaps for half a century. Any information that can be conveyed or received on this important matter cannot fail to be both useful and interesting,

and we shall be very glad to receive any notes on fruits that our correspondents or readers have proved to be useful, and that excel in the quality of early ripening.



THE PHLOX.

THE merits of this family are so well known, as represented by the many varieties of the late-flowering and the early-flowering sections now in cultivation, that it is quite unnecessary to do more than allude to these. The huge pyramidal heads of bloom borne by the finer kinds of the late-flowering section, in addition to the rich colours of some sorts, has somewhat eclipsed the neater growing early-flowering sorts, notwithstanding the fragrance and waxiness of their flowers as compared with the more popular section. Unfortunately, from a florist's point of view, the Phlox is much too easy to cultivate. The flower-loving portion of the community, as a matter of course, look on that as a point in their favour; and, accordingly, allow Phloxes, when they get them, pretty well to follow their own devices, and, permitting them to grow into huge herbaceous masses, they cull the diminished heads of bloom, and think them lovely.

Such an easily accommodated plant may, in consequence thereof, be successfully cultivated without following rigidly any hard and fast line of culture. The cottager may gain his end for securing strong young growths by dividing his old plants quite as effectually as the most particular of particular florists, who only condescends to grow plants which are propagated at a certain season and in a certain way. Propagation by division is the simplest method of rearing young flowering-plants, and though in disfavour amongst those who cultivate the Phlox for purposes of exhibition, it is, nevertheless, when gone about at a proper time and in a proper manner, a very efficient mode of keeping up young stock. The best time to propagatate by division is about the end of September,—no earlier, and not much later. It is assumed that no plants older than three years at most are tolerated. Such plants may be broken into pieces just large enough to produce from three to five strong shoots the following season. The ground intended for their reception having been trenched two or three spits in depth, and manured according to the wants of the soil or the size of the manure-heap, the divided pieces are to be planted about the same depth as before, and staked as the operation is proceeded with, in order to keep the old stems and foliage fresh as long as possible, to secure a grip of the soil to the young plants, and to mature the buds for a strong start in spring. These will break away early without suffering any check to the young shoots, and merely require to have the ground between the plants pointed when growth has fairly commenced, at the

same time breaking off all the weakest sprays, the strongest of the shoots being selected to make the current season's plant. Five of these are quite enough to leave, that good heads of bloom may be secured. Other necessary work consists in putting strong sticks to each shoot at an early stage of their growth, mulching the surface of the beds with rotted manure where the soil is naturally poor and light: artificial manure mixed with soot, or by itself, and applied occasionally in showery weather, is very beneficial. Plants treated thus will produce very fine spikes. Plants for producing spikes for exhibition are propagated from cuttings. These may be successfully struck at any season of the year. Small healthy root-cuttings make the strongest plants, and may be successfully struck with about equally good results in the long-run, either from the young growths produced out-of-doors in spring, or earlier in the year from cuttings produced from potted plants kept over the winter in a cool house. In the former case the cuttings will strike in a cold frame, and may either (after roots are produced) be planted out in nursery beds, or potted and grown on for producing flowers in pots the succeeding year, after which the same treatment, when planted out in beds, will be required as above indicated for divided plants. In the latter case it is necessary to lift plants in autumn after the stems are cut down, and pot them up in as small pots as will conveniently hold the roots without breaking off too many of these to gain that end. These plants must be wintered in a structure where they will commence to move into growth shortly after the turn of the year, so as to have cuttings ready by the beginning of February. These cuttings are to be broken off at their junction with the root-stock, and inserted in an open compost in thumb-pots. There is no better place for putting these than a common dung-frame, a very useful institution at that season. Here, with a moderately brisk bottom-heat, roots are produced in a comparatively short time. Air will be constantly required to be left on the frame, in order to keep the atmospheric temperature low, so that the young plants may have no inducement to commence weakly growth. When rooted, the pots are better taken out of the plunging material, on the surface of which they may stand for a week or ten days, when a shift into 4-inch pots will be necessary. A compost of loam and mushroom-dung is very suitable for these, a sprinkling of crushed bones being an advantageous addition. When potted, do not return them to the dung-frame, unless the heat has become spent and low. A cold pit or frame without means of artificial heating suits the plants admirably. There, as the natural heat increases, the plants will grow slowly but healthily, at the same time filling the pots with strong roots. By the beginning of April another shift into 6-inch pots will be required. In these the plants will produce each a strong spike; though rather late, the early-flowering sorts will flower at the same time with the established plants of the late-flowering section; and this is therefore a good way to get the finest of these in for

showing at the autumn exhibitions. The late-flowering sorts are useful for decorating the conservatory late in autumn. The succeeding year the same plants may be grown on still in pots, shifting them finally into 9-inch pots, and bringing on three to five shoots for flowering. These make handsome objects where the conservatory is a large one. Or the plants may be kept over winter in the pots, and early the succeeding spring planted out into beds prepared as previously advised for divided pieces. Spikes cut for exhibition very generally flag or droop shortly after staging. To obviate this to as great a degree as possible, insert as much of the stem, *with leaves attached*, as at all convenient in water. By this means an infinitely greater amount of water is absorbed then when the end of the stem merely is inserted in the water. Some of the finer kinds for exhibition, as well as for ordinary decorative purposes, in both sections, are the following: Bryan Wynne, Lothair, Chanzy, Amabilis, Coccinea, Queen of Whites, Venus, Mrs Laing, Miss Macrae, Lady Napier, Duchess of Athole, Lilacina, A. M'Keith, M. Dunn, Princess Louise, Roi des Roses, Vierge Marie, Madame Moisset, Resplendens Coccinea. These are all strong-growing and fine varieties, and will form the nucleus of a collection to any one who wishes to "go in" for the culture of the Phlox.

R. P. BROTHERSTON.



ON THE SUMMER MANAGEMENT OF FORCING-HOUSES.

THE management of forcing-houses in winter and spring has been treated of so often and so well by several correspondents of 'The Gardener,' that it would be difficult to write much that is new upon the subject, viewing the matter merely from a practical standpoint. I think, however, that the summer management of forcing-houses is somewhat overlooked, from the fact of the assistance rendered by the natural agencies of warmth and light. These agencies are not under-estimated by us: on the contrary, we recognise their fullest value in forcing at all seasons; but there should be practical co-operation working along with these influences in due season.

We have heard it remarked before now that there is a good deal of repetition in the writings of the present day upon practical horticultural subjects. We think it is well that this should be so, as long as the matter is of a sound and practical nature, and will bear analysing. It is good for amateurs; it is good for those who are enlarging their horticultural sphere by plodding steps, and who gather much information from the practical writings of experienced cultivators; and it is especially good for young men for whom the horticultural press has done so much, and is likely to do a good deal more. It

cannot, we think, be denied that the migrations of young men, and of some older hands too, is beneficial in so far as the opportunity, if properly used, may be turned to good account in acquiring experience in the conduct of every work. We find forcing-houses arranged on different principles, from the old-fashioned style of forty years ago down to the most modern ideas of the present day; and he who desires to add to his store of knowledge, may fairly exercise what resources he possesses in discriminating between principles which are the converse the one to the other.

Now, if we begin with the most common of everyday operations—viz., that of giving air—we find room for exercising intelligence of the first order. There may be those houses so constructed that if air be not given in good time to dry up all condensed moisture from the leaves of Vines and Peach-trees, scorching is sure to ensue, or the tissues of the leaves may be crippled so that they do not perform their natural functions. It is simple to avoid this if the trees are kept in a healthy condition at the root. There is then little or no necessity for so much syringing to keep foliage clean.

Houses that lack the means of giving abundance of air require, in fact, special treatment of their own. They require a well-drained healthy border, in the first place; and secondly, they require a careful system of atmospheric treatment, and a practised stoker who has judgment to anticipate the weather and control his heating power with an experienced hand. The shutting-up and syringing of these houses with the same amount of atmospheric moisture, and at the same time, as houses of modern capacity—where plants are exposed to abundance of healthy air during the greater part of the day,—is as mischievous a practice as can well be imagined. In the case of Vines, the young growths will in a few days become extended and elongated beyond their normal length, causing confusion in training, and the bunches to become loose and straggling. The right course to adopt would be to keep the roots abundantly supplied with water, to give air early in the morning—say by 6.30 or 7 A.M.—and to sprinkle neither borders nor paths at any time except with full ventilation on in fine weather, and keep on top air till late in the evening. It is surprising how soon a difference in the growth and foliage of Vines will be perceptible under the latter course of treatment. The leaves become large and leathery, the shoots short-jointed, and the bunches compact and shapely. How much longer will it be before this barbarous practice of bathing Vines is entirely dispensed with?

In the case of Peach-trees—much as has been written upon the subject, we still find cases similar to that of the Vines above referred to, and the conditions that apply to the one case will apply also to

the other. We find work falling into arrears in the way of disbudding, thinning, &c., to be a gross sacrifice and waste of the trees—resources which should be otherwise directed. We also find, in the case of tying in shoots (and here our young readers should be attentive), that where two or three are tied up together in a mass, to the exclusion of air and light, the result is unripe wood, feeble growth, flowers with badly-developed organs, and consequently defective fruits, which are not up to the mark in size or quality.

It should, perhaps, be observed here, that in the case of Peach growth the shoots can be as readily arranged and the vigour concentrated into any given number of shoots, as in the case of the Vine; whilst the converse result may be produced by pinching, which diverts the flow of sap into two or more channels, instead of one. Aim at a moderate and regular degree of growth of a size that will bear triplet buds, and let the foliage be of a dark, glossy green, and leathery to the feel.

In later houses which are being pushed forward or retarded according to circumstances, examine the borders down to the drainage by using a long narrow scoop, by which the condition of the soil may be tested, and if the latter is anything like dry, water carefully on two or three different occasions until the soil is thoroughly moistened. This is a much better plan than that of submerging a border that has been kept at the extreme of dryness for some time before. It enables the roots to recruit themselves gradually, and to resume their active condition of providing for the stems and leaves in a natural manner. It is also the first remedy (as dryness is the first cause) for red-spider, and is a more feasible plan of getting rid of the pest than by dashing the young leaves to shreds with cold water from a garden engine.

With regard to forcing pits, where Melons, Cucumbers, Strawberries, Beans, &c., are forced in quantity, the watering of the plants at the root, and the atmospheric conditions that are maintained, will either tend to promote good health and cleanliness, or it may have the contrary effect if the supply be not nicely gauged according to the respective requirements of the plants, their locality, and stage of growth. Melons will bear any amount of sun if they are grown hard and stubby, and may be watered as freely as Cucumbers in bright weather. The surface of the soil should also be mulched with cow or horse manure to encourage surface roots, and to save watering, which requires to be done more frequently when the soil is exposed to constant evaporation.

Cucumbers that are grown in houses through the summer, if the plants are to be kept healthy, should have a moderate degree of shade,

and be trained fully 18 inches from the glass. All superfluous fruits should be removed before they draw unnecessarily on the resources of the plants. We prefer, however, to grow Cucumbers in low pits or frames through the summer, or from about June to September.

Strawberries in pots should always be watered between 9 and 10 A.M. every morning, and looked over again in the afternoon, if cleanliness is to be a certainty. Beans in pots and planted out should also be supplied with water at a uniform temperature—that is to say, if the Beans are planted out in a pit. With bottom-heat, do not give them water from 20° to 30° lower than the soil they are growing in. We know that we expect the weather to grow warmer daily, but a few hours or days of sunshine will not have the same effect in increasing the temperature of water two or three feet beneath the surface of the earth, that it will have in raising the temperature of the air in glass structures, or even upon plants that are growing upon the surface of the earth outside. It is therefore advisable to have all tanks filled with water in the morning (where there is not a supply in the houses inside), so that it will be exposed to the softening influence of air and heat before it is used for plants that are grown under glass.

It is by giving attention to minor details, and by assisting nature, that we succeed with summer crops; and still more so, that we succeed in producing fertility in fruit trees and other plants that are to be forced out of season.

CULTIVATOR.



CHOICE HARDY SPRING FLOWERS.

Narcissus.—The Narcissi are essentially flowers of spring. They are all beautiful, and there is a very considerable number of varieties and species in cultivation. In fact, there are perhaps too many varieties: there are certainly too many names; for they greatly exceed the number of distinct sorts. Certain connoisseurs profess to discern well-marked specific distinctions, where ordinary observers fail to detect even the merest differences in form or colour. But independently of the confusion of nomenclature and embarrassing synonymy that one has to face in taking up the genus as a subject of study, there is a strong attraction induced by their fragrance and beauty, which helps to overcome the natural repugnance arising therefrom. The following brief list is not vouched for as being more scientifically correct than any other, but it contains the names of some of the best sorts in cultivation; and they have the

additional merit also of being generally known by the names attached to them, which is not always the case with many other varieties ; for many are merely known to a few who make a speciality of the genus, and distribute them one to another in the way of exchange.

N. biflorus.—This is a strong-growing sort, with broad glaucous leaves a foot or more long. The flowers, usually in pairs, but sometimes solitary, are large, the divisions of the corolla overlapping each other in their ample breadth ; the crown is yellow and cup-shaped.

N. bicolor.—This is one of the most beautiful, and certainly not one of the most plentiful. The petals or divisions of the corolla are very light canary, and the crown, which is long and trumpet-shaped, is a fine saffron colour.

N. bulbocodium—the Hoop-petticoat Narcissus—is one of the most singular, as well as one of the most beautiful, of the genus. There is no confounding it with any other species : it is so thoroughly distinct and characteristic, that it is by some authors held to be worthy of a separate generic status and name. The leaves are almost cylindrical and rush-like, the flowers composed of very narrow strap-like petals, and the crown very long, wide, and expanding elegantly and vase-like ; and both crown and petals are a very bright and pleasing tone of yellow.

N. incomparabilis, and its variety, called *bicoloratus*, are striking and handsome. The foliage is broad, massive, and long, deeply glaucous, and in fine harmony with the soft canary of the flowers.

N. jonquilla—the Jonquil—though not one of the showiest, is one that should be in every garden on account of its peculiarly delicate and pleasing fragrance. Being also one of the earliest to appear, it is the more welcome and desirable.

N. Empress.—This is a fine garden form, one of the boldest and most striking, with immensely large golden-yellow flowers, the trumpet-shaped crown being very long, and expanding wide.

N. Macleaii.—A very distinct and fine sort, with, for the vigour and robustness of the plant, comparatively short leaves, which usually do not exceed half the length of the flower-scapes. The latter ascend to about a foot high, sometimes terminating in two flowers, but more commonly in one flower only, the petals being broad and overlapping, pure white ; while the crown, which is about half an inch long, is bright yellow.

N. moschatatus.—Of this there are some varieties well worth growing, but the most useful is the type with fine pale canary or maize-coloured petals and crown, and the double-flowered form, which is one of the handsomest of the group. Between this form and the *N. cernuus* and *cernuus plena* occurs an illustration of the embarrassing synonymy alluded to a little farther back as cumbering this popular genus of spring flowers. I have failed to discern the distinction, whatever it may be, that is alleged to exist between these two so-called species,

and think that one or other of the names should be expunged from lists. *N. minor*.—This is a diminutive Daffodil, and well worth a place in every garden. It does not exceed four or five inches in height, even when most luxuriant. The flowers are bright yellow, and the foliage is deeply glaucous: it is invaluable for edging lines or clumps in the front line of flower-borders. *N. Sabinii* is one of the grandest and most striking of the group. The foliage is broad, massive, and erect. The petals are long and broad, overlapping each other, and deep canary-yellow; the golden crown is long and very wide, expanding, and slightly reflexed at the mouth, and crimped on the margin. This is without any superior in the yellow Daffodil single-flowered section: there is a massiveness and grandeur about the whole plant that is only approached in two other varieties that have come under my notice—and they are *Emperor* and *Empress*; but both these, while they are in no way superior to *Sabinii*, are too near in character to be desirable in the same collection—that is, if it is to be distinctive in its components. Amongst the double-flowered forms of the Daffodil section I shall only notice two, which are the best that I have met with. They are *telamonius plenus*—a fine golden-yellow, double in the most emphatic sense, and more resembling a double African Marigold than a Narcissus—and *Pseudo-Narcissus grandiplenus*, similar in style to the preceding, but less golden than yellow. The name is evidently the creation of some enthusiastic amateur, whose love of the sort tided him over the fear of dislocating his jaw. *Pseudo-Narcissus* is bad enough to pronounce with any degree of elegance and ease, but followed by such a quadrisyllable as *grandiplenus*, pronunciation becomes hazardous. *N. poeticus* being one of the latest of the genus to appear in flower, generally well on towards the end of May, or even in the beginning of June, in the north, is one of the best worth cultivating, independently of its great beauty and elegance. It is inferior to none in its attractive elegance; while in the delicacy of its perfume it surpasses perhaps every other species in the genus. The double form of this lovely species is a very useful one, being as fragrant as a Gardenia, and not inferior to that flower in shape, and at the same time more durable, being less liable also to become discoloured than it. It is one of the best cut-flowers of its season. *N. Tazetta*, the parent of the Polyanthus Narcissus, is so distinct in its character that it deserves a place in every collection. Were it for no other reason than its early-flowering quality, it is worthy of being cultivated; but it is also a very fragrant sort, and offers a good many varieties of considerable elegance and beauty.

Bulbocodium vernum.—A very beautiful plant in the mass, Crocus-like in the form of its flowers, and also in its habit of pushing

up its flowers in advance of its leaves. The flowers are rosy-purple, and appear in February and March.

Convallaria majalis (*Lily of the Valley*).—Although rather late to appear in flower, no list of spring flowers would be complete without this elegant and sweet universal favourite. It is one of the very few cultivated plants which have held an unassailable position in the estimation of the public, notwithstanding the changes of fashion.

Erythronium dens-canis (*the Dog's-tooth Violet*).—A very beautiful and free-flowering plant, pretty generally cultivated, and well worthy of being so. The foliage alone is most attractive, with its brown and glaucous-green blotches; but the flowers, which are produced in great profusion in March and April, are no less attractive. There are two or three varieties—a deep rosy-purple one, and one with paler purple flowers, and a white-flowered one which is very pretty as a variety and contrast with the others. *E. americanum* is not so often to be met with in gardens as the preceding, but it is no less worthy of general cultivation. The leaves are more lanceolate in form, but are similarly marked with brown spots; the flowers are fully larger in size, and are yellow in colour. It flowers later than *E. dens-canis*, generally about the middle of April.

Fritillaria.—Of this genus there are several forms which are worthy of being included among spring flowers when the collection is to be composed of all that combine early-flowering qualities with some beauty or elegance in form or colour. But the *Fritillarias* cannot be regarded as decorative plants; they are more curious and elegant than showy and striking in colour. *F. Meleagris* is the best known, excepting perhaps the *Crown Imperial* (*F. imperialis*), which flowers too late to be fit to include in a list of spring flowers, and also the handsomest both in colour and form. There are several varieties, the best being that usually regarded as the normal form, with purple-brown spotted flowers, and the white-flowered one. *F. nigra* has very deep, dark, reddish-brown flowers, and *F. obliqua* purple-brown flowers.

Hyacinthus.—It is unnecessary to mention the varieties of *H. orientalis*, which are so universally grown in pots and bedded out in the flower-garden; but this paper would be incomplete without a notice of *H. amethystinus*, which is a totally different type of Hyacinth to the beautiful forms alluded to. As the name denotes, the flowers are amethyst blue, in loose open spikes, more like some of the varieties of *Scilla nutans*, the *Wood Hyacinth*, than the more erect close-spiked *H. orientalis*. It flowers towards the middle or end of April.

Muscari (*Grape Hyacinth*).—These are lovely and very popular

spring flowers. *M. moschatum* is too late in flowering to be fit to recommend as a spring flower, but any mention of the genus would be incomplete were it left unnoticed, on account of its delicious fragrance. *M. botryoides cornosum*, and its monstrous form known as the *Feather Hyacinth*, and *M. racemosum*, are the best known, and are indispensable ornaments of the garden in spring; but the handsomest of the genus is *M. Szovitzianum*. It is nearest in general character to *racemosum*, but is greatly superior to it in colour, and is also neater in foliage and habit. It is blue, but such an unapproachable blue as I have never met with in any other flower. It is a very scarce plant, but should be added to every collection of choice things.

Ornithogalum, or *Star of Bethlehem*, may be passed over with the remark that, though very free-flowering plants, they are somewhat common, not to say vulgar looking. They are capable of producing a good effect in glades in woods, and in suchlike positions, but they are apt to give a collection of choice plants a somewhat untidy and ordinary appearance when any considerable number of them are cultivated. They are all white-flowered.

Scilla (*Squill*).—This is one of the loveliest of the genera of spring flowers. *S. amœna*, *bifolia*, *campanulata*, *italica*, *nutans*, and *sibirica*, are the principal of the spring-flowering sorts, and all should be grown in quantity. Of *bifolia*, *campanulata*, and *nutans*, there are several varieties that are useful as furnishing materials for a variety of decorative effects.

Trillium grandiflorum.—A very choice and beautiful plant, somewhat singular as well in structure and aspect. The flowers are pure white, and appear in ordinary seasons in the end of April, and last till the end of May.

Tulipa (*the Tulip*).—This furnishes some of the most splendid flowers of spring. The later-flowering varieties, which are derived from *T. Gesneriana*, are unsurpassed in the variety and brilliancy of their colours; and the earlier-flowering ones, which, if less varied, are not less brilliant, are derived chiefly from *T. suaveolens*, both species being natives of southern Europe. Two of the best early-flowering species are *T. Clusiana* and *T. præcox*, the latter bright scarlet, the former purple, white, and red.

W. SUTHERLAND.

CRAIGLEITH NURSERY, EDINBURGH.



THE VITALITY OF SEEDS.

It has been recently asserted that the reason why old Melon seeds produce more fruitful plants than young seeds produce, is because the starch the old seeds contain is gradually converted into albumen, which is less readily soluble than starch, therefore the plants raised from old seeds do not grow so vigorously and are more fruitful than stronger-growing plants raised from young seeds. This is advanced on the authority of Loudon. In the first place, such a change is an utter impossibility; in the second, in Loudon's days chemists had not ascertained the composition of Melon seeds, and therefore Loudon's statement was only assertion—and loose assertion too—as he could not possibly have known the chemical formula of starch and albumen, or he would never for a moment have supposed the possibility of starch being converted into albumen. Loudon's mistake was excusable; but how are we to excuse those who go on repeating it so long after the idea which gave it birth has been exploded? The truth is—and, practically, it is of some value to know it—that after a year or two Melon seeds gradually lose their vitality, and as the vital power becomes less the plants produced are less robust, and—that is all. There is a very erroneous idea entertained and acted on, that Melon seeds two or three years' old produce earlier and more fruitful plants than one-year-old seeds. It is certainly quite true, and by careful comparison we have satisfied ourselves of its being so, that plants raised from seeds old enough to have an impaired vitality generally show *fruit-blossom* earlier and in even greater abundance than when the plants were raised from seeds whose vitality was unimpaired. But the conclusion which seems to have been universally arrived at is quite erroneous. We have on more than one occasion proved what we are now saying. It is not from any positive quality possessed by old seeds, but rather in consequence of an impaired vitality, that the plants are earlier and more fruitful. Lessen the vigour of plants raised from new seeds by using poorer soil while the plants are being nursed in pots previous to final transplanting, or by the use of smaller pots or a lower temperature than is consistent with a vigorous development, or by any means whatever whereby the constitution of the plants is brought to the level of plants raised from seeds with an impaired vitality, and you will find the results quite the same. This being the case, any difference between new Melon and Cucumber seeds can be regulated at will and according to the appliances of the cultivator,—for not only can new seeds be brought to produce plants similar every way to that produced by older seeds by the “levelling-down” system, but equality may be restored to a certain extent by the “levelling-up” process as well, by using soil a little richer than usual: but perhaps this is only putting the same fact in a different form.

On the same subject, under a somewhat different title, a writer in a

contemporary tells us, among other things, how to produce crops of Peas, by simply using seeds of unimpaired vitality. Quoting the same authority—Loudon—he tells us that if we wish Peas of an earlier type, all we have to do is to take Peas for seed which had not been quite matured. The observation which led to such advice was surely of the shallowest description. That immature Peas used for seed really do produce a somewhat earlier crop we know to be true, but to say that an earlier type can be thus produced is wholly incorrect. An early tendency thus produced is not permanent, but a merely accidental circumstance, and wholly on account of an impaired vitality. Impair the vitality of the plants to an equal extent in other ways by sowing in thin, hot, or poor soils, or by transplanting and so injuring the roots, and the result will be quite the same,—the enhanced earliness being produced wholly in consequence of the altered circumstances, and not because of an inherent quality in the seeds.

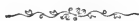
Another case which we have carefully proved, and which has more than once proved itself, much to our chagrin, has been in the case of Leeks sown in heat about the first of February, to be grown on for exhibition purposes in August and September. Whenever the seeds have been a little inferior, either from age or imperfect maturation, we have always found that the produce of such seeds was inferior to the produce of plump, well-ripened seeds; and not only so, but a large percentage of those produced from the inferior seeds ran to seed by August, while with first-rate seed we have found it quite safe to sow as early as the middle of January.

Numerous other instances might be cited to show that many failures arise from seeds with impaired vitality. Some years ago Mr Simpson raised the question, Why the earliest crops of Turnips sometimes ran straight to flower from the seed-leaf, when under what one would consider fair circumstances; and sometimes, under less favourable circumstances, a fair crop was secured before the spindling for seed commenced? No one answered the question thus raised. Probably the experience of cultivators was identical to the querist's, and as little able to "tell the reason why" as he. Since that time we have never seen a sowing of these "bolt" prematurely without considering the circumstances under which they had been grown, with a view to discover the cause; and as showing the truth of what we have written above, we recall two different sets of circumstances under which part of the crop bolted and the other did not. The first happened some time ago. In digging over some ground which had been dug and half of it manured the previous autumn, we gave the whole a good dressing of well-decayed manure, not knowing that one-half had been dressed before. On this ground our earliest Turnips were sown. Those on the twice-manured portion perfected a very fine crop: those on the once-manured nearly all ran to seed without bulbing at all. Since then we have taken care to have the ground

intended for our earliest Turnips liberally manured, and have had good reason to be satisfied with the practice. The other occasion was only last season, and it goes to prove that a vigorous growth, in the earlier stages especially, helps materially to prevent premature seeding. We had some seed left from the previous year, and we made an equal sowing of old seed and new. From the first a difference was discernible. The new seed came up first and strongest; the new seed gave us some fine Turnips, with only a few "seeders:" the old seed gave us only a few bulbs, and a fine crop of plants which ran prematurely to seed. But we need not multiply examples. It is well enough known that Celery, Lettuce, &c., whenever they get a check, have their tendency to seeding increased, and when kept growing vigorously the tendency is in part overcome. Poverty, drought, crowdedness, and many other influences, hasten the flowering period; and, last but not least, although far too often overlooked, seed with a vitality not strong enough to give a vigorous growth from the very first. We ought to aim at a vigorous growth from the very first, because weakly seedlings are only made vigorous plants with great difficulty, and often enough it proves to be an impossibility.

Now these are facts well worth knowing and acting upon. Low-priced seeds are often enough very dear seeds, although inexperienced persons sometimes think otherwise, until taught the truth through painful experience. Old seeds are often enough worse than useless because they lead to a cumbering of ground with weakly produce which might have carried a robust vegetation. With a proper method, and with a knowledge of what is wanted, together with the amount of seed required to crop a given space, there is no reason why any seeds should be left over from one year to another; and when there is, it is as often as not the falsest economy to use the old seed instead of buying new.

A. M.



THE AMATEUR'S GARDEN.

ROOT CROPS.

(Continued from page 280.)

The Parsnip.—To obtain good Parsnips the seed requires to be sown as soon in the year as the soil is in good working order. We generally manage to get ours in some time in February, and never later than the middle of March if we can help it. At the same time, Parsnips can be secured although the seed be not sown until April, but never so fine as those sown earlier, unless under very exceptional circumstances. There is no fear of the seed on the score of hardness, as in the case of the Beet; and no fear of it running prematurely to seed, as in the case of the Carrot and Turnip,—so that it can be sown as soon as the soil is friable and dry. And perhaps it may not be out of place here to call the attention of *young gardeners* to the above facts, for it is the custom of some to sow their Carrots, Parsnips, and Beet on the same day; and the consequence is,

that the Parsnips do not grow to so large a size as when sown earlier, while it is not an unfrequent occurrence for a large proportion of the Carrot and Beet-root crops to run to seed when sown too early, which of course renders them unfit for use.

The finest Parsnips are raised in deep, rather light soil, in good condition, but having no fresh manure added. The very large Parsnips seen at exhibitions are grown in very rich soil; but these are rather coarse compared with those grown in soil only moderately rich. The soil should be trenched or dug as deeply as possible during autumn or winter, to get it into as free and friable a condition as early in the season as possible; but no manure should be added—presuming that the ground was manured for the previous crop. In spring the first opportunity that occurs should be seized upon for breaking the surface of the soil finely with a fork, sowing each row as the digging proceeds, so as to prevent the necessity for treading on the soil afterwards. At the same time, we have raised fine crops in light soils by merely levelling the ground with a Dutch hoe, drawing the drills, and raking the surface smooth. This, of course, necessitates a good deal of treading on the soil; but when the soil is sandy and dry, the treading is beneficial rather than otherwise, which is not the case when the soil is heavy. The nature of the soil must determine which of the two ways ought to be adopted.

Draw the drills 18 inches apart, and as deep as will allow of the seeds being covered to the depth of an inch. Scatter the seeds so that they will not be thrown together in heaps, otherwise there will be great difficulty in thinning them. As soon as the plants can be observed, run a hoe between the rows, for the double purpose of killing the weeds and loosening the surface-soil. As soon as they have formed two rough leaves thin them carefully, leaving them six inches apart in the rows. Their after-cultivation merely consists in clearing them of weeds, and in keeping the surface of the soil well loosened with the hoe. They are ready for use whenever large enough, but do not attain perfection until frozen through. They may be allowed to stand where they grow during winter, as no amount of frost will injure them; while lifting and storing them, as is usually done, spoils them a good deal—so much so, in fact, that we have known them refused by those who otherwise were very fond of them.

To grow them clean, straight, and large for exhibition purposes, a good plan is to trench a deep, rich piece of soil 3 feet deep or so. Put a layer of well-decomposed manure in the bottom of the trench. Afterwards, when the soil is frozen on the surface, drive a strong sharp-pointed stake at intervals of nine inches in the line down to the bottom of the trench, and fill in the holes with fine light rich soil, made moderately firm to prevent it sinking more than the surrounding surface, and sow a patch of seeds on the top; and when to remove all but the strongest.

Carrots.—These are perhaps of more value than Parsnips to the owners of small gardens, and they are more generally used. We recommend pretty much the same treatment as described for Parsnips, but the main crop had better not be sown until the middle or latter end of April, according to the weather. A small bed of Early Horn may, however, be sown in March in some sheltered corner in the full sun, or even at the end of February if a slight hotbed can be afforded them under the protection of an ordinary cold frame. Should young tender Carrots be wanted all through the summer and autumn, sowings may be made at intervals of a month up till July; but the returns, when the garden ground is limited, will scarcely repay the trouble. Still it often happens that different individuals have different wants, and we have

indicated how a constant supply of small young Carrots may be had for as long a period as is possible with the ordinary appliance possessed by an ordinary amateur.

The main crop will require lifting and storing by October. They may be buried in sand in a dry corner of a cool cellar or shed, or they may be put in a pit in the same way that Potatoes are stored. If they are just kept from frost, it is enough. Heat will cause them to spring into growth, which spoils them.

Beet requires very similar treatment to the above. Sow about the end of March for an early supply; but many of these will run to seed in summer. For main crop sow at the end of April. Lift and store in the same way as recommended for Carrots. In lifting take care not to break or bruise the roots, and in cutting off the tops cut the tops only, but do not cut the roots, or they will bleed and allow the juice to escape.

Turnips for an early supply may be sown as directed for Carrots, in a hot-bed or in a warm spot. Make two very small sowings in March for the chance of a few; but they will very likely run to seed before bulbing. Larger sowings may be made in April with more confidence, and in May onwards in whatever quantity may be required without any fear of their "bolting." The earliest-sown batches should get as favourable a position as possible, and in rich soil. One great means of preventing the early sowings running to seed is to keep them growing by means of rich soil. The later ones should be sown on ordinary soils, as rich soil in their case gives a tremendous crop of leaves, but very inferior roots.

The ordinary plan practised by amateurs, of making one sowing suffice, is not a good one. A small sowing every three weeks up till August is much better, as it keeps up a supply of young Turnips, which are always to be preferred to old ones. Should fly prove troublesome, a good dusting of soot or dry lime—not hot lime—when the plants are wet with dew will help them to pull through, and a watering with well-diluted paraffine-oil *between*, not on, the rows before the plants are up will sometimes prevent their appearance at all. 15 inches between the rows and 9 inches between the plants in the rows are suitable distances for those to be used young. Do not allow them to be crowded, as is usually the case, for they grow all to tops. Swedish Turnips for winter supply, or for furnishing Turnip-tops as a substitute for Seakale, require to be sown towards the end of May. Allow them 20 to 24 inches between the rows, according to the productiveness of the soil, and 1 foot to 15 inches between the plants. Store in pits like Potatoes, using plenty of straw and only a few inches of earth.

A GARDENER.

HARDY FRUITS.

THE destruction of insects is perhaps the most important matter requiring the attention of the fruit-cultivator at this year. Black-fly, green-fly, and caterpillars have all been well represented this year, and no ordinary attention has been enough to keep them from destroying young growths. Cherries are generally among the first and worst to suffer from aphids. When the shoots have made good growth, and before they are tied in to the walls, an effort should be made to keep down insects by syringing with tobacco-water. Where there is fruit this operation is difficult to perform without doing mischief. The tops of the shoots which are to be nailed in should be handled separately, dip-

ping the point of each in a shallow vessel of tobacco-water : tobacco-powder and soft-soap, or Gishurst Compound, are equally as good. Examine them in a day or two, and repeat the operation if life is left in any of the pests. Where trees are of full size, and little growth is required, there is not much difficulty in securing clean, healthy foliage. The tops, which are generally attacked, alone can be nipped off. This applies to all trees which do well with spurring ; and I do not know any which fail by this practice, as when one batch of blossoms may be cut off by severity of weather, there are generally plenty to succeed them. Apples are often attacked by green-fly and American bug. The curling up of the leaves with the former renders their destruction almost impossible. Young trees suffer most from this pest ; and where it can be done, hand-picking off the tops which are infested, and afterwards applying the engine with tobacco-water, and washing with clean water, seems the only method of eradicating the vermin. The white American bug, now so common, defies nearly every application while the trees are in foliage. Those which were washed with brine during the winter, and afterwards coated with a paint made with lime, soot, soft-soap, and sulphur, suffer but little during the growing season. When these remedies are well followed up, the pest becomes stamped out in time. Apricots are subject to a kind of grub which curl themselves up in the young tops of the leaves, and nothing short of hand-picking that we have seen can reach them. The shoots should be kept thin, so that when the necessary wood for next season's crops is tied in, all the foliage and fruit may have the benefit of sun and air. Those who work on the spur system entirely must keep this same important matter in mind. Spurs can be kept as close to the walls as young shoots. Choose those next to the walls ; keep them there. The same applies to Plums. Though plenty of fruit may be had on out-growing shoots, the appearance of rough spurs is objectionable, and in time the tree gets out of bearing and health. Continued stopping of gross wood which is monopolising the energies of the trees should be attended to. Most cultivators recognise the advantages of attention during the growing season, though all cannot find time to do the work. Pears are by some denuded of their growths as they grow, but we think this is opposing nature instead of assisting her ; and to do justice to tree and fruit alike, we prefer going over the trees at different periods, taking off a portion of wood, always the strongest growths first. Early attention to training out the leading shoots must not be forgotten, as they are very liable to get broken. Old trees bearing well, and making little or no growth, may be materially assisted by applications of guano-water or liquid manure from the stable or cow-yard. Peaches and Nectarines require attention often, so that they do not become matted in their growth. The shoots should be kept very thin, and the trees syringed with tobacco-powder water : if there are no vermin, the syringing is a good preventive. It may be premature to do much thinning of fruit, but where they are very thickly set in clusters, it is no guarantee of safety to leave them to destroy each other. Leave the fruit always which are best exposed to sun and air. The largest and best-formed fruit in early stages are generally the best when ripe. Strawberries are always a temptation to birds, and netting them is the only safe remedy. The netting of all bush fruits and trees on walls, such as Cherries, must not be overlooked. Delays in such cases are dangerous.

M. T.

MANAGEMENT OF VINE-BORDERS.

WHILE much is being written in some of our contemporaries of the changes and fluctuating habits of the Vine, we have many important facts before us this season. I have reason to believe that the season of '79 will long be remembered as one which aroused all the energies of the cultivators of early-forced fruits. We have letters from many parts of the country, north and south of the Tweed, regarding the difficulties in starting early Vines, Strawberries, and Peaches. With the two latter we have ourselves little to complain of, they having done remarkably well, although they moved very slowly. But as it is the Vines we are considering, I may say that I never had a more difficult matter on hand than to get the early house to break into growth. They, in fact, would neither lead nor drive. Muscats started two months later than Hamburgs set their crops nearly as early, and required thinning at same time. They both came away rather weakly at first, but have now made up for it by good wood and plenty of large leathery foliage; the crops are also abundant. The early house was covered with stable litter, and boarded over to throw off rain; but as we had somewhat severe frost in October, just before this covering was placed over the border, which was no doubt greatly cooled by such severe weather so early in the season, the Muscat-roots were covered by dry soil only; and in March the soil seemed much more kindly and healthier than the manure-covered border: besides, the influence of the little sun we had at long intervals was shielded off by the littery covering; and I have no doubt whatever but the early house was rather a sufferer from the covering than benefited by it. We have, over a course of many years' successful forcing of Vines to ripen by end of April and early in May, used dry materials, such as leaves and manure, to help (?) the roots into action—but we have been more successful in starting them when covered with dry ferns, over which have been placed rushes or straw. When such covering has been removed we have found the surface of the soil dry, dusty, and healthy, but never in any case have we seen a surface from which manure coverings were removed but they were sodden and on the sour side. Charcoal-dust mixed with dry soil, and lights of frames placed over this to keep it dry, after being spread over the Vine-roots, is our favourite protection; and this placed over later vineries (say when started in January and February), without glass protection, answers admirably. While we do not condemn warm manure over Vine-roots, we believe the system has been sadly abused. It would be difficult for us to number the Vine-roots we have untombed as being ruined (this extends over a period of

twenty-five years) by the abuse of fermenting materials. A few years ago we turned up two borders which had supplied remarkably fine Grapes for exhibition and market by the Vines planted in them; but being soured and ruined at the beginning, the roots either were killed or never went into the soil at all, as scarcely any were found in the border, they having found their way to the foundation of the front walls, and there they remained, probably from twenty to thirty years. But to hear the older labourers on the place tell how carefully "our old master" had his manure prepared, added to periodically, heat-sticks carefully pulled out and replaced, and when the covering was removed a small portion left over the border, keeping "roots" intact, and mixed with a little fresh surfacing of bones, lime-rubbish, and loam,—believing that this was the secret of success, the industrious man of mysterious knowledge spent time, talents, and a deal of expense, to secure crops of fine Grapes. I counted seventeen or eighteen layers of the surfacing when removing the border, but did not even find skeletons of roots in the soil.

There is a better system required than the littery one for starting Vine-roots, though difficult to get at. But I heard one of the greatest of Grape-growers once say that he preferred glass covering to all others for roots,—viz., to throw off the water—harvest sun-heat—air could be admitted—the soil is not soured—the rough appearance is avoided—and the glass can be applied for other purposes during spring and summer.

MIDLAND GARDENER.



NOTES ON DECORATIVE GREENHOUSE PLANTS.

THE CHRYSANTHEMUM.

WHAT a blank there would be during the dull winter months in our greenhouses and conservatories, had we not this brilliant and most useful flower to fall back upon during this period of the year! Not only is the Chrysanthemum useful in the decoration of greenhouses, but few flowers stand so well when cut; and therefore where cut flowers are in demand in quantity, the Chrysanthemum supplies a want that would not be easily filled up otherwise.

The Chrysanthemum has also the merit of being easy of cultivation, and, like many other florist flowers, has undergone a vast improvement during the last ten years or so, many of the Japanese varieties especially being very beautiful, both in regard to variety of colour and size of flowers.

There is a great diversity of opinion among gardeners as to what is the best time for putting in the cuttings. Some recommend November, while others again affirm that February is the best time. We are

of opinion, however, that the time for putting them in depends very much on the purpose for which they are required,—whether for large specimen plants to produce large quantities of bloom, or plants to produce merely a few extra-sized blooms for exhibition purposes. If large plants are required, then we should put in the cuttings by December at the latest: 6-inch pots are a very suitable size to put them in. Prepare them in the usual way by draining well, and then fill three-parts full with any potting-soil, finishing off with pure silver-sand, as it is not intended they should remain long in the pots after being rooted. Two, three, or more varieties may be put in each pot, according to the number of plants required; only there should be a considerable margin left for casualties, and when potting them off the best can be selected.

When the cuttings are inserted, water them through a fine rose, and stand the pots in a warm pit. It is not necessary that they should be plunged in bottom-heat; but of course where a moderate heat can be supplied this way, it will hasten the process of rooting. Give an occasional dewing with the syringe at shutting-up time. As soon as they are nicely rooted, pot them up singly into 3-inch pots, in moderately rich soil, with a good dash of sand to keep it open, and place them in a pit where they can enjoy a night temperature of about 60°, with proportionate increase during the day. Keep them well supplied with water; and after they have grown about 3 inches, pinch out the points to make them branch out and form good stools—the laterals to be again pinched after they make three pairs of leaves. When the roots have reached the sides of the pots, they will want shifting into larger pots: 6-inch pots should be used for this shift, and the compost to consist of one-half of good fibry loam, the remainder being made up of one part sharp river or silver sand, one part of leaf-mould and one part of well-rotted dung, or bone meal. In potting, ram the soil pretty firmly about the ball, as there is less risk of it turning sour if firm. When they have well taken with this shift, they may be removed to a cooler house, still keeping the points pinched out as they make three pairs of leaves. About the middle of May they will require another and final shift into the flowering-pots, which may be 8, 9, or 10 inch as desired, using the same kind of compost as at the last shift, only it may be somewhat rougher, and a layer of old dung may be put over the crocks: ram the soil firmly into the pots, and plunge them out-of-doors in a sheltered place. They may be pinched for the last time about the end of June, and must be attended with water when required; and turn the plants round occasionally, as well to let them get the sun equally on all sides as to break any roots that may find their way through the drain-holes of the pots. If they are allowed to make roots in this way, they may receive a check when they come to be housed, and then lose their bottom leaves: nothing looks more unsightly than to see them with long bare stems. They will require

to be supported with stakes, so as to prevent them being broken with wind.

After the flower-buds begin to show, they will receive much advantage from a watering twice a-week with manure-water; and nothing in this way is better than good Peruvian guano, steeped, and then a little poured off into the watering-pot as you require it, merely colouring the water with it. They will require to be housed about the middle of October, and a few of the most advanced may be put into a gentle heat, when they will soon come into flower.

We have been speaking of plants for general decorative purposes, as being those most generally grown—those grown for exhibition purposes being managed in some respects somewhat differently. For this purpose the cuttings are quite soon enough if put in about the beginning of February. The cuttings should be put in in the same manner as described above, but the pots must be plunged in a hotbed or other place where a bottom-heat of about 80° can be had. When rooted, pot off singly in 3-inch pots, and after they begin to grow pinch out the points, but after this they need not be pinched again, the object being to throw as much vigour as possible into two or three stems. Of course they grow very tall, and we have seen them from 5 to 7 feet high. They must be kept growing, and shifted into larger pots as they require to be moved. Pot firmly, and they may be plunged out-of-doors in a sheltered place, as described for the others. Keep them well supplied with water, and securely staked: when the roots have pretty well filled the pots, give manure-waterings. They must be housed early in October, and pushed forward or kept back according to the time they are wanted. When the flower-buds appear, they must be thinned out, leaving only two or three on each shoot.

We have seen the *Chrysanthemum* turned out of the 3-inch pots into a moderately rich border, and potted up again in September; but unless very carefully done, and kept close and shaded for a time afterwards, they are apt to lose a large portion of their lower leaves.

Nice dwarf plants, useful for front rows or for vases, may be grown by putting in cuttings in April, and treating them in all respects like the others, only keeping them in 4-inch pots, and pinched in to make them dwarf and bushy.

J. G., W.



BOILERS AND PIPES.

WHILE the discussion on heating is going on in your pages, it may not be inopportune to raise a few collateral questions on the subject of boilers and pipes, &c., on which I would be glad to hear the opinion of your correspondent, Mr Makenzie, who appears to be pretty well up on the subject, and also of others. As regards boilers,

without professing to be an expert in such matters, my opinion is that the apparatus which presents the greatest amount of surface to the direct or first action of the fire, and which can be entirely enveloped in the flame of the furnace, must be the best; and it seems to me that the boiler which does this is one of the shape of a penny-piece, with a perfectly flat under surface and a slightly convex top, at the apex of which the flow-pipe would start and the returns would enter opposite each other at each side of the penny,—the water-way to be about the usual capacity of the saddle-boiler—that is, from 2 to 3 inches thick. I propose to set such a boiler above a shallow circular basin of fire-brick—the fireplace being represented by the bottom of the basin—and to cover it above with another inverted basin of fire-brick brought down to within 2 or 3 inches of the surface of the boiler, the flue going out at the flow-pipe at the crown of the boiler. The boiler would, of course, only be slung by flanges, so as to leave a space about two inches wide round the edges for the draught: the fire being exactly under the centre of the boiler, the draught would be equal all round, and the flame would envelop the whole apparatus perfectly. In order to make the door air-tight, I propose to face it with fire-brick, and work it by a pulley and balance-weight—the door, when closed, dropping on to a bevelled seat in front of the grate, the door itself being bevelled in order to fit. The object of the bevel is to prevent ashes lying on the grate and keeping the door from shutting close. I may state that I have experimented with such doors and found them to work smoothly, and to need no banging or knocking to make them shut—practices which destroy ninety-nine furnace-doors in a hundred. Of course, the door runs in a perpendicular groove in which no obstruction could possibly settle. It may be stated that the furnace-door would be the only brick in the basin below the boiler; but the fuel is meant to lie on a circular grate of small diameter in the centre of the basin, and when the fire gets fairly ignited the red-hot cinders would be spread outwards round and up the sides of the basin, and the fresh fuel thrown in the centre, thus so far burning the smoke as it passes over the red-hot fuel towards the edges of the boiler. I do not know that I could better explain my ideas without a plan; but your readers may guess pretty near what I mean by imagining a penny-piece placed horizontally in the air, with a saucer of the same size, and a hole in the centre of it, inverted above it, the fire being represented by a candle held under the penny, and the flame travelling over its under surface, round the edges, and over the top and out at the hole at the crown of the saucer.

And now I will endeavour to record some experiments with a minia-

ture boiler of this description. I had a boiler 6 inches in diameter, and having a water-way from one-eighth to a quarter of an inch thick, and holding about a couple of wine-glassfuls of water, made of block tin, and set, complete, in the same material as it would be in fire-brick, the external surface being covered with non-conducting felt. This boiler, as well as the whole of the apparatus, was made at a Midland foundry, where the experiments were carried out, and where I was kindly afforded every facility for giving the boiler a fair trial on a small scale. When the boiler was sent to me for inspection, before trial, I found written on its under surface, "The Boiler of the Future," but the best laid schemes gang oft a-gley. Well, the nominal heating-power of horticultural boilers is put at something like 50 square feet of surface of hot-water pipes to every square foot of boiler surface, though I never heard of any boiler that could do this effectively, or anything like it. Still "the boiler of the future" ought to accomplish the very most we had, 250 feet or 3000 inches of half-inch gas-piping attached to the thin 6-inch circular boiler—about the right proportion—the piping being coiled round a drum, and the flow-piping starting from the crown of the boiler and descending the spiral coil to the bottom of the drum, and then bending off and entering the boiler by the return openings at each side—everything, in short, being arranged exactly as we heat our hothouses. A spirit-lamp was applied to heat the water, and then our difficulties began; and neither the founder nor myself could overcome or explain them at the time, though I have found a certain hypothesis on the subject since: but that is neither here nor there at present. No sooner was the lamp applied than the water began to circulate—running a considerable way round the coil by the flow, and making the pipes so hot that a touch blistered the hands. Then the pipes would as suddenly cool again in the flow-pipe, and the water would begin to flow round by the *return*-pipes just as far and as hotly; then circulation in that direction would cease without any apparent cause and begin at the right end again; and so on many times, the water in the boiler all the time apparently boiling "fit to burst." Alterations were made, and the length of piping considerably diminished, &c. &c., but to no purpose. At last the boiler burst, after hours of patient coaxing, and we had to leave the shops and run for the train as black and smutty as any Sheffield "grinder," and not a little puzzled on the subject of "hot-water circulation." Here was a boiler constructed on sound principles—on the common saddle principle, one might say—with the flow-pipe at the highest point, and the return entering at the lowest—absolutely refusing to conduct itself as in theory it ought to do. I have not had time to return to the experi-

ment again, but meanwhile would be glad if any of your readers could explain what it was that was at fault. It was not the fault of arrangement of the pipes, or of the expansion-box, or of air in the pipes, and the outlets and inlets of the flow and return-pipes were of the same capacity. All the arrangements, indeed, were in the usual orthodox manner. The experiment, so far as it went, showed that the boiler had great and unusual power—the fault was in the circulation.

Had the experiment succeeded, it was my intention to have a boiler fixed here, and to attach to it pipes of oval instead of circular shape, that would present the same amount of heating surface as a 4-inch pipe, but which would contain considerably less water, and be sooner heated. This, I am aware, would have necessitated a more constant fire in severe weather ; still I am not sure but that pipes which are soon heated and soon cooled are the best in hot-houses, where it is often desirable to reduce or raise the temperature quickly.

J. S. W.



KALOSANTHES.

A BEAUTIFUL genus of succulent plants, forming splendid specimens in a short time, when a little attention can be devoted to them. The flowers, which are produced in large clusters on the points of the shoots, are singularly shaped and brilliantly coloured, and a large well-trained specimen in full flower is a rather conspicuous object in the greenhouse or conservatory.

The best time to propagate them is in July and August, selecting cuttings from shoots which are not showing flower, as there are always a few of these to be found on large plants. The strongest of the cuttings should be inserted singly into 60-sized pots, and three or more of the weaker ones in a 4-inch pot, in a compost of light loam, leaf-mould, and a good addition of sharp sand, the pots having previously been carefully crocked, with a layer of moss or rough fibry material placed over them. They should then be placed in a cold frame on a bed of ashes, and watered so as to wet the whole of the soil in the pots, after which keep close and shade carefully for a few days during the middle of the day when the sun is most powerful. In such a place they will emit roots and fill the cutting pots in a very short time, when the shading should be dispensed with. After they are well rooted they should be shifted on into pots two or three sizes larger than those they were struck in, draining them well as before, and giving them a nice rich loam with a fair proportion of sand and broken charcoal ; or where the latter cannot be procured, a few bricks or potsherds broken very small and mixed with the soil will make a

good substitute. After this shift, any of the shoots that are likely to take the lead should have their points pinched out, to encourage lateral growths. This may be done up to the end of September or beginning of October, when it must be discontinued till the following spring. The greenhouse or Melon-house will be a suitable place to winter them in; and great care must be taken in watering them during the dull dark months of winter, giving just enough to keep them in a sweet healthy condition, and by no means practise the drying-off process, or they will shrivel and lose a lot of their bottom leaves, which spoils the look of the plants, besides injuring their constitution.

By February they will begin to grow, and if desirable can be encouraged with a little heat, and by the middle or end of March they will require another good shift, when the shoots should be nicely regulated and tied out to neat stakes. They will now need plenty of water, with a little liquid manure occasionally in a very weak state; and if desirable they can be gradually hardened off and stood out of doors in the open air during the summer months. The next shift will be into their flowering pots, which must not be deferred till too late in the season; and the plants must also be housed in good time, although we have invariably noticed the colour come much finer and brighter when allowed to partially open their flowers in the full sun out of doors. At the same time they must not be allowed to get wet, or the quality of the flowers will be injured; and when under cover, the flowering period can be greatly prolonged by a slight shade. There are a great many varieties of this elegant genus, but for general decorative purposes the old *coccinea* stands unrivalled. A few cuttings struck and grown on annually will keep up a better succession of bloom than troubling with the old plants after they have flowered; and we would strongly recommend them to all lovers of greenhouse flowering-plants.

DUKDONIAN.



PYRUS MAULEII.

APART from the great beauty of its flowers and fruit when cultivated in ordinary circumstances, our experience of this splendid novelty during the past spring warrants us in believing that it will soon become one of the most popular of forcing shrubs. We saw plants of about a foot high, potted in 6-inch pots, and introduced in the beginning of the year into gentle heat, with from eighteen to twenty-five of their brilliant yellowish-crimson flowers, fully expanded in the beginning of March. These, as may be imagined, were very much admired, and formed quite a feature among the other flowering-plants with which they were associated in the greenhouse. Have any of the other readers of 'The Gardener' tried it for this purpose?

OMEGA.

REMARKS ON FRUIT-CULTURE.

NOTWITHSTANDING the books that have been written, and the gardening periodicals that have been filled weekly with information upon fruit-forcing and fruit-growing generally, there still seems to be a great difference of opinion among cultivators upon the subject. Not only is this the case with amateurs and persons who might be considered as inexperienced, but we also find fruit-growers of some repute differing upon the most fundamental principles of fruit-culture.

Now, in advocating the claims of any particular system of fruit-culture or anything else, if the "principle" is wrong the whole fabric of the argument must necessarily fall to the ground; and in the same way if any particular variety or varieties of fruit be extolled by any grower upon the narrow grounds that it has answered his own purpose, this theory, too, must of necessity evaporate in the presence of more accurate facts and results which have been proved beyond the region of mere assertions. I need hardly say that I refer to a recent discussion in a contemporary upon the relative merits of certain varieties of Strawberries, as well as to certain allegations that have been made regarding Vine-leaves being a sure proof of the quality of the crop.

As regards the Strawberries—the successful forcing of which requires thought, skill, and strict attention—I am ready to yield to every grower what I claim for myself—viz., that of knowing my own wants and circumstances best, and therefore that I have a right to choose for myself whatever course seems best to adopt; but the aspect of affairs is altered if I recommend for general cultivation what is in fact but a foible of my own.

The varieties that have been pitted against each other are Black Prince and Sir Charles Napier. I dismiss the former, because it is not worth growing after February, either for home consumption or for market purposes. The reason and the proof go together. The reason we do not grow Black Prince is because we can get three times the weight of fruit, of larger size and finer appearance, from the same space of Vicomtesse Hericart de Thury. We cannot ignore weight and quality any more than we can ignore the fact that Black Prince is simply a Strawberry for a warm outdoor border, and that it is a useful variety for preserving.

As to the merits of Sir Charles Napier, I have heard a good many opinions expressed about them. Some people object to its "acidity," others like it for a change, but call it a third-rate or market kind. I am, however, disposed to think that the principal objection some

people have to it is that they have not discovered exactly the conditions under which it thrives best—or if they have, they have been very lax in their attention. Sir Charles Napier is one of the most tender Strawberries grown; it is the first to become injured either in the open ground or in pots from the effects of severe frost, and has also the objectionable habit of throwing up young leaves in the centre of the crown till late in the autumn, which renders it a subject that requires special attention. Our own practice has been to pot off the plants of this variety about the first or second week in August, and to remove all the side crowns during the growing season. The plants are always put in safe quarters (not necessarily covered) before frost sets in; and in the spring when they begin to grow they are at first brought forward in cold pits, and then placed in airy positions in orchard-houses or elsewhere where conditions are similar, but never forced unless under pressing circumstances. Sir Charles is not a forcer, but when the fruits are colouring the temperature should be raised, and with plenty of air given at the same time the produce will be of the first appearance and quality. I have never seen Sir Charles beaten when properly grown and finished. It comes in well for the month of May, but when forced earlier the weather is not favourable enough to give as much air as the variety requires, and the leaf-stalks become drawn, to the detriment of the fruit.

As to Strawberry-forcing generally, I would like to say a word or two on behalf of beginners. It is a work which entails great patience and labour to do it well, and each cultivator should determine for himself the varieties which are best adapted for his own particular purpose. As, for instance, we see *Vicomtesse de Thury* and *Keen's Seedling* often recommended as being first-rate croppers in certain districts, but no reference is made to their travelling qualities—a point of great importance if the fruit has to be sent by rail a distance of two or three hundred miles. *Keen's Seedling* is one of the worst travellers, and the *Vicomtesse* should not be grown for travelling purposes after the end of April.

When I was at Otterspool I began with *Vicomtesse de Thury*, next in order came Underhill's *Sir Harry*, and *President*, and then *Sir Charles Napier*, *Dr Hogg*, and *James Veitch*, in the order named. To grow a smooth-skinned Strawberry for travelling long distances is not good practice where appearance and high finish are expected.

With reference to the question of large Vine-leaves being any indication of superior Grape-culture, my own personal observation leads me to the conclusion that it is just the reverse. It is a sure sign that the Vines have "bolted" with the grower, and that they are galloping with a loose rein. Are the prize Grapes of our exhibitions,

which are characterised by the highest finish, gathered from Vines with leaves like Chinese parasols, or are they the produce of Vines with medium leaves, leathery to the feel, with medium-sized wood hard and brown as hazel? If any one is disposed to dispute the grounds of my argument, I will furnish leaves perhaps nearly 16 inches in diameter, from Vines, where I can prove that the roots are in the worst possible condition, and the Grapes are far from being what would be expected from Vines bearing such fine leaves. I think, if I may be allowed to draw a feeble comparison, the capacity of the Vine in many respects after a few years' high cultivation has never been satisfactorily estimated by their leaves, any more than a phrenologist is able to tell the quality or exact capacity of the human brain by feeling the bumps of a man's head.

W. HINDS.



CYPERUS ALTERNIFOLIUS.

WHEN well grown this is a most graceful plant for table decoration, and deserves to be cultivated as such. Plants grown in 5-inch pots, furnished with from twelve to sixteen whorls about 18 inches high, are an admirable size for the table. Even plants with fewer stalks are much admired; they by no means obstruct the view across or from end to end of the table. *C. alternifolius variegatus* is more admired by some; but it cannot be utilised to the same extent as the former, on account of it losing its variegation when propagated by cuttings. When otherwise propagated they are not so equally developed and well furnished. The crowns of the latter are divided, as a means of preserving the variegation; and it is thought by some, that when soil is light and somewhat impoverished with sand, the foliage is the whiter. Neither is the absence of variegation felt on the dinner-table; surrounded with plate, and mostly every other thing of a light colour, makes the grassy-green of *C. alternifolius* preferable—it contrasts so well with everything on the table.

For propagation, the whorl is taken, with 6 or 8 inches of the stalk, and thrown into the water-tank in the stove, and kept in the water till it emits roots and begins to send up young leaves; or put into a watering-pot full of water and kept in some corner of the stove. The pot is preferable, as it is less subject to a change of temperature.

When young roots and leaves appear, they are taken from the water, and the stalks are shortened to within 2 inches of the whorl. The whorl is drawn through the hand, bringing the points of the leaves together, which are shortened the same as the stalk. They

are then inserted in the bed of the propagating-pit; the hole is made sufficient to admit of the young roots; the cutting is put in stalk downward; the whorl is bent upward, forming a cup, which is filled with the sand of the bed, and sufficiently watered to firm the whole together. The proper depth for the cuttings is, centre of whorl half an inch below the surface. The bottom-heat is from 75° to 80° , always giving a liberal supply of water.

A few weeks will make them ready for being put into 3-inch pots, and placed in the stove till June. When they are finally shifted into 5-inch pots, the ordinary compost of loam, leaf-mould, and sand suits them admirably; and they can be grown throughout the summer in a gentle hot-bed. The pots are plunged to the rim, allowing the plants plenty of room to spread their whorls; and turning them round every second day induces a symmetrical growth, and prevents the roots getting a firm hold of the bed.

Cuttings taken in March or April, and grown as recommended, will be ready for table decoration by the end of August.

W. L.



HEATING BY HOT WATER.

I.

ALLOW me to reply as briefly as I can to Mr Hammond's article in the 'Gardener' for May, where he criticises my letter in the preceding number.

In answer to my question, Why water transmitted its heat to ice? he says, "I may remark that hot ice would be a curiosity." If I understand Mr Hammond's definition of *hot* to mean, to raise the temperature of, I may reply that ice becomes hot when it is being converted into water, which is not at all a "curiosity." I consider extreme cold as the absence of heat; and if the temperature of a body is raised by the application of heat, that body becomes hot according to his definition, although the general acceptation of the word means sensible heat. He thinks it is impossible to heat ice by any means. But I have to inform him that ice is not always at the same temperature. "Ice," he says, "is an exception to the rule that all bodies expand by heat." But I must remind him that ice is only a transformation of a body, and if that body is converted to its normal condition, water, it expands by the application of heat, like all other bodies. His test of the conducting power of water is to drop a ball of ice into hot water for a few minutes, then take it out, and put what remains unthawed amongst cold water, and because the ice does not raise the temperature of the water (which must, according to the law of nature, already be at a higher temperature than the water), but has "an *opposite effect*," he "thus proves that the particles of water are incapable of transmitting heat to each other by conduction." But from their "having the opposite effect" we may infer they are capable of conducting cold—or in other words, that it has lowered the temperature of the water, which proves most effectually that *the heat has been absorbed by the ice*. I will also here inform Mr Ham-

mond that there is a certain amount of heat become latent when ice is converted into water, which he can prove for himself by the following simple experiment. Procure a uniform source of heat, and fill a vessel with ice below 32° Fahr., having a thermometer placed in it. Apply the heat and the temperature will rise to 32°. At that point it will remain until all the ice is converted into water—that is, seven-ninths of the time that the same source of heat is required to raise the temperature of the water from 32° to the boiling point, 212°. He truly says, “Facts are chieft that winna ding;” but he thinks my statement concerning the transmitting power of water is only “an assertion,” and takes it to mean “that water parts with its heat to all bodies in the same degree,” which is “true,” he says. Now I fail to see the difference. If water parts with its heat to water, “or to all bodies in the same degree,” I cannot see that it is of any material difference whether we call it *parting* or *transmitting*. His admission furnishes conclusive proof that my facts are “chieft that winna ding” by any false logic. The material with which water comes in contact has got nothing to do with the transmitting power of water; that depends upon the conducting power of the material itself. He “wonders how wooden pipes would act in heating plant-houses. If it is a fact that water transmits heat to all bodies in the same degree, wooden pipes should heat our plant-houses equally as well as iron.” He forgets that wood is a bad conductor; and supposing he had iron (which, he admits, is a good conductor) covered with wood, the wood would still be a bad conductor, but that would not alter the conducting power of the iron. I wish it to be understood that I do not consider water to be a good conductor. That is one of the reasons why it is of so much service in heating plant-houses, by parting with its heat slowly. Then he says, “It is also a mistake to suppose that expansion is the cause of circulation.” Then further on he says, “Heat and expansion are the first promoters of circulation.” I fail to see the difference between the promoter and the cause here. He says, expansion is from the centre and acts equally in all directions—it therefore cannot cause the water to move in one direction only. “But though heat and expansion are the promoters,” he says, “neither is the cause, they are only agents. That is the difference of the specific gravity of the water at different points of the apparatus.” But what is the cause of that difference? Is it not the expansion which, instead of moving equally in all directions, moves in one direction only—that is, towards the highest point of elevation. The difference of the specific gravity of the two volumes of water, then, is the consequent result of expansion, which must be the primary cause.

In reference to what Mr Hammond is pleased to “distinguish” as my “mixed, equalised, forcing theory,” I cannot agree with him that there is a distinct line drawn between hot and cold water in the same pipe, either vertically or horizontally. Therefore I must adhere to my statement, that mixing and equalising must go on to a certain extent, at the commencement of circulation, until the water reaches the highest point of elevation, from whence it will return by its own specific gravity. Neither can I believe that there could be a return-current of cold water in the flow without being affected and intercepted by the warm current proceeding direct from the boiler while the legitimate course was open for it by the return. He does not think it is “true” that hotter and lighter water can force colder and heavier water on an uphill course, certainly not without mixing with it to a certain extent. I shall endeavour to prove that such does take place. It must either be forced or drawn uphill. Now, to prove that it is not drawn: there are generally air-

pipes at the highest point of elevation, and before the heavy column in the return would draw up the column in the flow, the air would rush in and fill up its place, which he can prove by a siphon. The only inference he can draw from my statement, that the highest point of the structure will be the hottest, is, "that it suffers no diminution of heat until it reaches that point." It is needless to refer further to such an absurdity. Nevertheless, it is a well-known fact that a house situated above the level of the others is the hottest from its having a quicker circulation, which proves the value of *elevation*. An imperfect circulation would take place by Mr Hammond's principle of construction on a small scale; but on an extensive system it would result in disappointment, where there are pipes branching from the main flow to houses at different points of the apparatus. On his principle there is neither a vertical nor gradient rise from the main flow to the houses to induce the water to circulate, consequently the circulation would principally take place in the main flow and return, which are not unfrequently under outside paths. It is unnecessary to advert to the fact that the rapidity with which water circulates is in proportion to the elevation and the difference of the weight of the two columns of water, which has already been ably treated of by Mr Makenzie last month. I do not wish to enter into a mere conflict of words with Mr Hammond, which, although it may affect to search after truth, in reality only raises such a dust that we are apt to lose sight of the subject. But with a single eye to truth, I have not the least objection.

C. M.

II.

MR HAMMOND has failed, I think, to bring anything forward of material value in support of his views on the circulation of hot water. He seems to have been more anxious to point out that there is no analogy between the emptying of a cistern by means of a syphon and the circulation of water in a heating apparatus, than he has been to explain why it is that the quickest circulation takes place in the highest parts of the apparatus, in preference to those coils of pipes that are less elevated above the boiler. If Mr Hammond can prove that it is not the additional weight of water in the return-pipes, but something else, that causes this to take place, he will be doing good service by at once correcting the error which has so long been entertained by hot-water engineers. I am quite willing to yield the point as to the ascent. I think I said it was immaterial. I would as soon have a vertical ascent as a slow gradient. Mr Hammond's mode of fixing pipes will not be very likely to meet with much favour by either gardeners or hot-water engineers, if it was for nothing else but for their appearance. Fancy a house, say 60 feet long, with four rows of pipes along the front! On entering the house the flow-pipes commence a *descent* of, say 1 in 120—that is, 6 inches in a length of 60 feet. The return-pipe must have the same slow descent at least, so that when the latter reaches the point where the pipes enter the house, there will be a clear space of 12 inches between the flow and return pipes. This I think would not look so well, nor be so convenient in fitting, and moreover would occupy more room, than they would if fitted up on what I suppose we will soon have to call the "old system." I think it would be better to adopt a medium course, that of having the flow and returns both *level* inside the house, and so parallel to each other. This is done by many, and with as much success as those fitted with a slow ascent.

I am quite prepared to believe what "J. H." says in support of Mr Hammond's system. Hot water is wonderfully accommodating where it has but *one way to circulate*. I am acquainted with an old fitter who boasts of his firm having successfully heated a house for a gentleman with only *one pipe* for both flow and return. (He did not say it was a four-inch.) "J. H." will no doubt be done for ever with the "old system." Suppose, now, for the sake of experiment, he was to fix pipes to his boiler, and give them the usual ascent from, and descent to, the boiler, does he believe that he would get as good a circulation in the pipes that descend from the boiler as in those that ascend? I venture to predict that the water would flow into the latter in preference to the former, if no check is put upon it in the shape of a valve. I shall not trespass further upon your valuable space.

R. INGLIS.

III.

I HAVE been rather interested the last few months in the question which has been raised by Mr Hammond on the circulation of hot water, and I think he is entitled to many thanks for bringing forward such a subject for discussion. I understand the main point raised in his first paper to be this: Is a continuous rise in the flow-pipe a hindrance to the circulation? Hot-water engineers say it is not, but I think a rational view of the case may prove the contrary. While quite agreeing with the correctness of Mr Makenzie's quotation from Mr Clarke's tables, I would only ask, Why continue the rise throughout the whole length of the flow-pipe? Is it done to give an increased fall to the body of water in the return-pipe, or is it to assist the circulation in the flow? If the latter, I think the proper designation ought to be the force-pipe. Mr Hammond points out, in his reply to Mr Inglis (p. 210), "The water owes its expansion and relative lightness to heat, in the first instance, and as heat fails, the water contracts and becomes heavier; it therefore follows that the heated volumes of water should reach the highest points of the apparatus before any diminution of their temperature takes place,"—and goes on to say, that when this point is reached by a slow gradient, the water must have become colder than at the time it left the boiler; and of course the greater distance it travels, the greater is the decrease of temperature—that every inch it has to be raised thereto adds an extra tax on the "pushing and pulling" powers of the colder and heavier water in the return-pipes. With which I entirely agree; and not only must this be the case, but every inch it has to be raised in the length of the flow is a *gradually increasing tax* on its own powers of flow.

Mr Hammond says, at p. 57, "As soon as the fire acts on the boiler, the particles of water in contact with its inner surface bound upwards, until they come in contact with the inner surface of the upper side of the flow-pipes. Here they part with a portion of their heat, and become of greater specific gravity than they were at the time of starting on their upward course, and would now commence to descend towards the point whence they started, but that they are still lighter than the particles composing the body of cold water in the flows," &c. So they would, but I would also take into account the cold water rushing in from the return-pipes, which I think is one of the principal causes of circulation; and as an instance of the descent of the water after reaching the top of the boiler, and the absence of this return current, I need only mention the homely illustration of a common tea-kettle. Therefore I should consider that to have the highest point of circulation as near to the boiler as

possible, and to have the return current with the greatest possible fall, would be the best means to insure a speedy circulation. This view is corroborated by your correspondent "J. H." in last month's number. And this is also the conclusion, I think, Mr Hammond arrives at in disposing of "C. M.'s" theory of the circulation. The idea of hot-water engineers, that a continuous rise in the flow-pipe, no matter of what length, accelerates circulation of the water, may turn out to be, like many another popular idea, a fallacy.

ROBT. STEVENS.

IV.

THE interesting discussion now taking place in 'The Gardener' on heating by hot water will be the means of showing to a great extent whether deep stokeholes are a necessity or not; and I am in a position to coincide with Mr Hammond that deep stokeholes in many cases are not required. We have in use tubular and saddle boilers, with a hermetically sealed box placed nearly above them, and into this box the hot water flows from the boiler, and then falls perpendicularly 7 feet to the pipes, which are then level throughout, the return pipe only falling 1 foot gradually at 9 feet from the boiler. It will thus be seen the only rise in the pipes is immediately above the boiler, and the returns fall at 9 feet from it—one boiler alone heating five houses, comprising an early vinery and stove; and during the past winter the heating arrangements were quite satisfactory. It is well to state that each range of houses is built on a level, and it is only in such cases this system could be satisfactorily carried out. But this system in our case proves conclusively to my mind that a continuous rise and fall is not required to cause circulation of hot water in pipes, and only where houses are built on different levels is it necessary to have the pipes highest at the extreme point, and in such cases the return pipe is high also. The theory that the higher the extreme point of the flow-pipe the more rapid the circulation of water in them, to my thinking is an error; for however high the elevation, the water would remain stationary without some other agency to bring about circulation, and the main agent is heat, and the more heat that is applied the quicker the flow. To further convey my meaning, let us commence with a fire just lit, and the boiler and pipes filled with cold water—that is, of equal density. The water in the boiler exposed to the heat will gradually get more rarified, and is displaced by the denser body which rushes in and takes its place, which is also made lighter and is again displaced, causing suction along the whole length of piping, drawing the water onwards in its wake,—and shows that however high the piping at the extreme end, the real centre of circulation is in the boiler, and the quicker the water is heated the quicker its displacement and the stronger the suction, and, as a consequence, the more rapid is the circulation of water in the pipes. I would here point out also that the higher the ascending pipes, the more suction is required by the descent to draw the water from the ascending pipes, and in this way the high elevation is equalised to a proportionate degree. As I have based my argument on suction, and it brought about by displacement of the lighter by a heavier body in the boiler, I may be allowed to show that it is suction that causes the circulation of hot water in pipes, and this can be conveniently exemplified by drawing a portion of the water off, leaving a vacuum at the highest point: the remaining body of water will then find a common level, and circulation in the pipes will cease. This shows that if the fire forced the heated water up the flow-pipe, it would continue to do so until the returning

pipes were empty. But that this is not the case will be evident to all who will try this simple experiment; for the water will keep a common level, and, fire away as we will, this state will not be altered, but the water will get heated slowly by conduction in the flow and return, and at an equal rate: but again fill up the pipes, and there is displacement of the rarified body by one of greater density at a slightly lower elevation, renewed by suction in the pipes, and causing circulation. Further, to show as a siphon that a high elevation is no promoter of quicker circulation, take a circular vessel, A, 4 feet deep, 2 feet in diameter, and standing 4 feet higher than B, of equal size; fill A full of water, and then bring your siphon 12 feet high or more from A to B. Let C and D be vessels of an equal size to A and B. Also, stand C 4 feet higher than D. C being full of water, bring your siphon only 2 feet high, the siphon reaching the bottom of each vessel. Let the water run in both siphons at the same time, and 2 feet will be drawn from A and C to B and D in the same time when the water in the vessels will have found a common level, and the siphon will cease to act, showing that no circulation can take place until the water in the boiler is made lighter and is displaced by the weightier column, and that it is not necessary to have a continuous rise or a high elevation to bring about this result.

ALBION.



THE GARDENER'S PRIMER.

NO. IV.

IT is in the mode of arrangement of the vascular tissue that the difference between the stems of monocotyledonous and dicotyledonous plants depends, and which has given rise to the use of the words "endogenous," as applicable to the stem-growth of monocotyledonous plants, and "exogenous," as applicable to the stem-growth of dicotyledonous plants. In the endogenous structure they are disposed throughout the cellular tissue of the stem, without any arrangement of pith, medullary rays, or bark, though of course there is the epidermis. The structure of exogenous stems requires a longer description, and then it will be only an imperfect one. Commencing at the centre of the stem axis is the pith or medulla, formed of cellular tissue; then surrounding it is the medullary sheath, formed of spiral vessels; from the pith towards the bark, periodically continued by the new growth, are flattened cells, called pith rays or medullary rays,—they apparently keep up the connection with the pith and the new growth, which would otherwise be shut off by the heart-wood, and also strengthen the stem fabric; then come layers of cellular tissue, called ligneous tissue or woody fibre (the older portion of cellular tissue hardened by deposit, and through which little or no sap can flow), called heart-wood or duramen, the use of which to the stem is to give it mechanical strength; next come the younger layers of cellular tissue outside the duramen, called the sap-wood or alburnum. It is through the

cells of this tissue that sap rising from the roots passes to the leaves ; and as each new growth or formation of cells is made exterior to the alburnum periodically—not necessarily yearly—there will be a new layer of growth, which will indicate one period of growth, whether of one year or less. In tropical climates, if the trees shed their leaves three times in a year, or five times in two years, we should expect to find as many layers of wood ; the innermost tissue of the alburnum becomes in its turn solidified and hardened by deposit, and in its turn becomes heart-wood or duramen. Then comes the cambium, or the cambium layer, variously described in its earlier stages as “semi-fluid mucilage,” “viscid secretion,” “cambial or formative tissue,” “opaque fluid,” or “mucilaginous semi-fluid matter ; but it is cellular tissue of delicate texture filled with assimilated granular matter in a state of vital activity forming new cells ; and in this tissue the primary vascular tissue, or bundles, as they are sometimes called, originate : here all the changes of the new growth take place, and with it the leaves seem to be in connection : it is found even at the point of the stem (*punctum vegetationis*) under the bud. Part of it goes to form the new woody fibre of the alburnum, and to continue the medullary rays in the direction of the bark ; other part of it goes to add to the internal bark or liber ; and other part separates the alburnum and the bark. The bark may be said to consist of three principal layers of cell-tissue—the inner one of fibro-vascular tissue, called the endophlœum or liber, the bast layer ; the middle layer of cells, differing from the external layer, called the mesophlœum ; and the external or corky layer, epiphlœum ; and then the epidermis. The pith wood and medullary rays may be seen in the herbaceous stems of an exogenous plant ; and there are medullary rays, but no pith, in the roots of exogenous plants. No hard and fast rules can be laid down by man which will always explain the works of nature, and accordingly there will be found among the exogenous plants exceptions to our explanations of the formation and arrangement of its tissue. In the Calycanthæ (Caroline Allspice family) there are some species which form woody columns in the bark, independent of the central woody formation ; and in some climbing plants a greater thickness of the medullary rays than usual will be found. In dicotyledonous plants the division of the stem into nodes, with internodes or spaces between, is taken advantage of by the gardener to increase the number of plants : this he does either by making cuttings of a portion of the stem at a leaf-bud just below a node, which, when placed in soil and warmth, will soon emit roots ; or by layering the stem or branch to the earth, fixing it at a node to the ground, and making an incision with a knife into the

node on the under side, and so forming a layer which will soon emit roots. It is thought that the presence of vascular tissue at the node is the cause of the rooting faculty of the cutting or layer. A cutting made of the internode of the stem only, without the node, will not grow; nor will any cutting, however made (with or without a node), of a monocotyledonous plant grow.

In complete union with the stem is the leaf, which in land-plants is formed of parenchyma, traversed by veins of fibro-vascular tissue, furnished at its upper surface with a covering or epidermis, then with a layer of cells flattened by the pressure of the atmosphere, then a layer of cells filled with chlorophyll granules, and then air-cells, and again an epidermis filled with stomata or breathing pores forming the under surface of the leaf. The leaves of aquatic plants are formed differently—the distribution of veins in the leaves is called venation, and for the most part they are reticulated in the dicotyledonous plants, and parallel in monocotyledonous plants; but some families, such as Smilacæ, have not unfrequently reticulated leaves. They are usually described according to their position, such as opposite, or alternate; or to their mode of insertion, as by a stalk, or as sessile, or as sheathed, or whether simple or compound (the descriptions of the forms and names given to leaves are too long for insertion here), or whether they have any appendages or not; and the edges of leaves, called circumscription, have been found to possess capital characteristics for their descriptions; sometimes they are annual; and the trees bearing leaves subject to the process of annually dropping or shedding their leaves are called deciduous trees. Sometimes the leaves continue longer than a year, and the trees are then called evergreen or persistent—that is, not falling off. Some leaves—not, however, strictly leaves—have on the centre midrib the flower, such as *Ruscus aculeatus*. There is a popular notion that every leaf originates in a cell of the stem, and that with increase of cells comes increase of foliage; and that each leaf has a corresponding root, and that with increase of foliage there must be increase of roots. It is difficult to trace the origin of these ideas.

The leaf containing in its cells chlorophyll, exercises a great power in the life of the plant. By the performance of some hidden function, due to cell-life in the presence of sunlight, the plant obtains its carbon, and the process is said to be as follows: during the action of sunlight upon the leaf of a plant, the green chlorophyll granules perform some function, not yet clearly shown what, by which carbon dioxide (carbonic acid), absorbed by the leaf from the atmosphere, is decomposed, and the carbon is retained, probably in conjunction with hydrogen in the water of the cell, some oxygen is set free, and some

retained ; it is rather a function of biology than of chemistry ; a *dead* leaf has not this power. It may be here stated that it has been said, and probably correctly, that the hydrogen present in plant-life is more probably derived from the water in the cells containing chlorophyll than from ammonia.

THE GRAPES AT ERNESPIE, NEAR CASTLE-DOUGLAS.

MANY of your readers will remember that Mr Kirk, gardener, Ernespie, carried away first honours for the best eight varieties of Grapes at the September show of the Royal Caledonian Society's meeting last September. His Grapes are equally, if not more, promising this year. This refers to nearly the whole of the varieties Mr Kirk grows ; but the most remarkably promising specimens are the Duke of Buccleuch. Both the wood and bunches of this variety are remarkable for their vigour. Several of the bunches of this variety are expected, if they finish as they did last year, to weigh from 5 to 6 lb. Mr Kirk uses much less moisture in his vineries than many Grape-growers, and it is his opinion that not only does this account for the splendid condition of the Duke, but of the other varieties as well. Whatever is the cause of it, the Duke does not succeed in very many gardens, and it certainly is to be regretted, for it is a very fine Grape.

A VISITOR.

CHAMÆDOREA HARTWEGII.

IT is the elegant or the majestic habit of Palms, and the conspicuous character and freshness of their leaves, which distinguish them as decorative plants. Some Palms also possess floral charms, in which respect none are more beautiful than *Chamædorea Hartwegii*, which develops its branched spadices, studded with numerous orange-coloured petals, during winter and spring. The male plants are more showy than the female, but when the former have shed their bloom, the latter become ornamental by the production of fruit, which remains till the close of autumn. The *Chamædorea* is a native of Caraccas, an elevated region near the coast of Venezuela, 10° north latitude, consequently it thrives best in a stove or an intermediate house. Plants 2 feet high and upwards make good flowering specimens ; but in order to secure an effective display, three conditions are essential—namely, liberal supplies of water and of liquid manure during the time of active growth ; exposure to air and sunlight, so far as this can be done without scorching ; and lastly, the destruction of scale and bug, which often lodge unobserved in the axils of the leaves. Standard plants will succeed for several years in a 10-inch pot, but to prevent its becoming too dry in the heat of summer, I

place flats below them. The soil should consist of a good fibry loam with a little sand added, and the potting must be firmly done. Fertilisation is effected simply by placing the two sexes so that the pollen falls on the female spadix; but the operation must be performed when the stigma is well seen, and when the stamens will bear a touch with the point of a knife. Our plants have bloomed in succession since November, and those which were impregnated are swelling their fruit.

JAMES SCOTT.

EDINBURGH BOTANIC GARDENS, *March 11, 1879.*



SCOTTISH HORTICULTURAL ASSOCIATION.

THE monthly meeting was held in the hall, 5 St Andrew Square, on the evening of Tuesday the 3d ult.—Mr Hugh Fraser, Vice-President, in the chair. After a variety of preliminary business, Mr William Sutherland, manager, Craigleith Nursery, read a paper upon “Alpine Plants.” Dealing, in the first place, with the claims of these plants upon all who had to do with decorative gardening, and strongly urging that they deserved more attention and more extensive cultivation, even in the most fashionable gardens, than had been usual for many years past, he adverted to their value as a means of education,—their large number and specific diversity of character being eminently fitted to engage the interest of young gardeners, and to lead them to acquire a more exact and scientific knowledge of plants than they in a general way possess at the present time. Turning to their culture, he gave a brief statement of the general conditions under which they are found in nature, from which he drew a variety of practical deductions, calculated to assist those who were beginning their cultivation. Alpines from high altitudes he had found more difficult to manage than those from lower levels, and he recommended such to be grown in pots, and kept in cold frames or pits, so as to secure the complete control of ventilation, shade, and moisture. It was pointed out, however, that by far the greater number of the species, and those by no means the least ornamental, were amenable to treatment as ordinary border or rock-work plants, where, under fairly favourable circumstances, they soon established themselves, and formed a permanent source of interest. In regard to rock-work, the author held that, provided good drainage could be secured, a low or even hollow site was preferable to such as was high and exposed. So far as soil was concerned, he had found a good loam the most generally useful—such species as required peat, peaty composts, or calcareous soils being comparatively few in number. An interesting conversation followed the reading of the paper, at the close of which Mr Sutherland received a cordial vote of thanks.

The table as usual was crowded with plants and cut flowers for exhibition, prominent among which were stands of Zonale Pelargoniums and double Petunia blooms, from Mr A. McLeod, Powburn. A seedling Alpine Auricula, named William Sang, from Mr William Young, 33 South Bridge: this is a remarkably fine flower, with smooth edges, a perfectly circular deep maroon edge, and bright golden eye. As might have been expected from a seedling of last year, the plant was small, and the Floral Committee, to whom it was submitted for a certificate, recommended its being grown for another year. Mr G. L. Brown, Millburn Cottage, had a collection of seedling Polyanthus, all very showy, and in one or two cases considerably above the average. Mr Scott, The Gardens, Corbet Castle,

Broughtly-Ferry, sent a well-bloomed specimen of a new double *Cineraria*, named Mrs Joseph Grimond. The flowers of this plant are of a showy crimson colour, and, though the petals are somewhat rough and irregularly arranged, the Floral Committee judged it a sufficient improvement upon its predecessors to be worthy of a first-class certificate. Messrs Downie & Laird exhibited a stand of seedling Pansies and Violas, including a fine new white variety called Mrs F. Mackenzie. Mr L. Dow, Saughton House, exhibited branches of *Ribes aurea*, an old-fashioned American deciduous shrub, too much neglected in our modern shrubberies. Messrs Thomas Methven & Sons had a plant of *Rhododendron*, Hugh Fraser—a variety raised in their establishment a few years ago. The flowers are rosy purple; and though only about eight inches above the pot, it had seven fully developed trusses. This sort, apart from the beauty of its colour, seems to deserve attention for its dwarf compact habit, and for its remarkable free-flowering quality. Messrs Dickson & Co. contributed a large collection of interesting subjects, including a branch of *Pyrus malus floribunda*, covered from end to end with blossoms, rich crimson outside and white within; *Ledum palustre*, an American shrub, with terminal corymbs of white flowers; *Kalmia glauca superba*, with bright pink cup-shaped blossoms; *Berberis Stenophylla*, described as a hybrid between *B. Darwinii* and *B. empetrifolia*, with a resemblance to both parents, but much more floriferous; *Oenothera Fraseria*, a neat, compact, semi-shrubby plant, with rich golden foliage, covered with black spots—this will undoubtedly be worth a trial for spring bedding; Violas, including many of the popular varieties, and two of great merit, named *Acme* and *Formosa*, the one of a rich purplish-crimson colour, and the other a beautiful lavender self, with dark eye. Interesting hybrids of Alpine Phloxes, of the *frondosa* and *Nielsonii* type, were shown by Mr R. Lindsay, Royal Botanic Gardens.

It was intimated that at next meeting Mr J. Grieve would read a paper on "Florist Flowers," Mr A. McKinnon one on the "Strawberry," and Mr Robert Lindsay one on "Filmy Ferns."



GRAND SUMMER SHOW.

ROYAL HORTICULTURAL SOCIETY. MAY 27th, 28th, 29th, and 30th.

THIS annual show, as evinced by the number of exhibitors and attendance of visitors, is fast becoming very popular, and quite worthy of the distinguished patronage usually bestowed upon it. On the present occasion it was honoured by the presence, on the opening day, of her Royal Highness the Princess of Wales, accompanied by the young Princess Victoria of Wales, the Duke and Duchess of Edinburgh, the Crown Prince of Denmark, the Crown Prince of Sweden, the Duke of Teck, &c. The tents in which the exhibits were arranged commenced near the Council-room with a long narrow one, which led up to a very large or monster tent in which was to be found most of the finest plants, including the Roses, all of which were arranged on turfy banks intersected with good walks. The Roses were shown in perfection for the first time this season, and were certainly the greatest attraction of the show. In the class for nine pot-Roses, Mr C. Turner, Slough, was first with magnificent specimens of *Celine Forestier*, *Madame Therese Levet*, *Victor Verdier*, *Edward Morren*, *La France*, *Duke of Edinburgh*, *Madame de St Joseph*, and *Charles Lawson*. The plant of the latter variety was perhaps the best in the show, and some idea can be formed of the size and beauty of this and the companion plants, when

it is stated to be 7 feet high, and carrying fully three hundred perfect blooms. The second prize collection, shown by Messrs G. Paul & Son, Cheshunt, were but little inferior to Mr Turner's, and far superior to those staged by them at the last year's show. Their largest and best-bloomed plant was a very fine specimen of *Celine Forestier*; and Charles Lawson, John Hopper, and Princess Mary of Cambridge were also very fine. In the class for twenty pot-Roses, the positions were reversed, Mr G. Paul securing the premier prize with a group of large, healthy, and well-bloomed plants, among which the *Marquise de Castellane*, *President*, and *Madame Victor Verdier* were very noticeable. Mr Turner was placed second with a group of smaller, but highly creditable plants; and Messrs J. Lane & Sons, Great Berkhamstead, third, for well-grown specimens in 10-inch pots. Mr Moorman showed well in the amateur class for six pot-Roses. Messrs Veitch & Sons, Chelsea, also exhibited a large group of pot-Roses, not for competition. Among these were interspersed a number of dwarf plants of Japanese Maples, the elegant and beautiful green foliage of which added much to the beauty of the group.

Near to the Roses, and apparently equalling them in their attractiveness, was the large group of Clematises exhibited by the Messrs Jackman & Son, Woking. The plants were well grown and flowered, and included all the leading varieties, the various shades of blue, &c., contrasting well with the Roses. Azaleas, both as exhibited by nurserymen and amateurs, were very fine and showy, some of the plants being 6 feet high and literally covered with bloom. In the Nurserymen's class, Mr C. Turner, Messrs Jackson & Sons, and Mr Wills were 1st, 2d, and 3d respectively; and among the amateurs, Messrs Child, Ratty, and Weston were successful.

Orchids were well represented: the finest group of fifteen distinct species in the show, and which obtained for the exhibitor the valuable prize of £20, was staged by Mr J. Douglas, Loxford Hall. His finest plant was a grand specimen of *Dendrobium nobile*, fully 4 feet through; and *Cattleya Warneri*, *Cypripedium villosum*, and *Dendrobium thyrsiflorum* were also very good. Mr H. James, Castle Nursery, received the second, and Messrs Jackson & Sons the third prize—good specimens staged in both instances. In the nurserymen's class, Mr B. S. Williams, Holloway, was awarded the first prize for an excellent group, which included excellent specimens of *Odontoglossum vexillarium*, *Masdevallia Lindenii*, *Cypripedium Swannianum*, *Cattleya Mossiae*, &c. Mr James was second in this class.

Mr W. Bull was the only exhibitor of *Odontoglossums*, and received the first prize for a highly creditable group.

There were three classes for stove and greenhouse plants in flower: in the open class for twelve, Messrs Jackson & Sons, Kingston, were placed first for fine plants of *Chorozema Lowii*, *Dracophyllum gracile*, *Anthurium Schertzerianum*, *Pimelia Hendersonii*, *Erica depressa*, Azaleas *Duc de Nassau* and *Stella*, *Clerodendron Balfourianum*, *Hedera Fuchsoides*, *Aphelexis purpurea*, and *Macrantha rosea*. Messrs Jackson & Sons were also first in the Nurserymen's class for eight plants in flower. In the corresponding class for amateurs, Mr J. Child, Garbrand Hall, Ewell, secured the first prize with a very meritorious group.

In the Amateurs' class for eight fine-foliage plants, Mr Rann, Handcross, Sussex, was placed first with grand specimens of *Crotons multicolor*, *variegatum*, and *angustifolium*, *Areca sapida*, *Latania borbonica*, *Cycas revoluta*, *Dasyllirion glaucum*, and *Zamia Lehmannii*. Mr Penfold also showed well in this class, and obtained the second prize.

Mr Child had the best six stove and greenhouse Ferns, his specimens of *Gleichenias Mendellii* and *G. Microphylla*, *C. ibotium Schiedeii*, *Dicksonia antarctica*, *Leptopteris superba*, and *Adiantum Farleyense* being remarkably good.

Mr Wills staged the best *Gloxinias*; Messrs J. Laing & Co., Forest Hill, the best Tuberous *Begonias*; and Mr Parker the best Hardy Plants.

Mr W. Bull was placed first for twelve new plants; Mr Wills second; and Mr B. S. Williams third. There were three competitors for the handsome silver cups, offered by Mr W. Bull for twelve new plants, sent out by him since 1876. Mr Rann secured the first prize with well-grown plants of *Lomaria Dalgairnsiae*, *Kentia Wendlandi*; *Crotons princeps*, *picturatum*, *Hendersonii*, and *Williamsii*; *Dracænas*, *rex*, *vivicans*, *Goldieana*, *Robinsoniana*, and *Dieffenbachia illusoris*. Mr Penfold, Beddington, was placed second; and Mr J. Hammond, Brayton, third. There were four groups arranged for the prizes offered for a group of miscellaneous plants arranged for effect, and occupying a space not exceeding 300 square feet, all of whom showed great taste in their arrangement of innumerable, and in some instances very valuable plants. Mr Wills secured the premier prize (£15) with a grand group, arranged in his well-known and unequalled style, though in our opinion scarcely so good as those arranged by him last year. The groundwork consisted of *Lycopodiums*, *Adiantums*, &c. Out of these were springing out groups of choice foliage and flowering plants; and towering over the whole many noble specimen Palms, Ferns, &c. Messrs Laing & Co. secured the second prize with a well-arranged and valuable group; and Messrs Peed & Sons and Mr Aldons were placed equal, third; the group arranged by the latter consisting entirely of white flowering and green foliage plants, and was both chaste and novel. Mr B. S. Williams had the first prize for a group of flowering-plants, staging a splendid lot of plants in his well-known style. Several valuable groups of plants, not for competition, were sent by the Messrs Veitch & Sons, Cutbush & Sons, Osborn & Sons, Mr B. S. Williams, and Mr Boller. In addition to the group of foliage and flowering plants, Messrs Osborn & Sons staged an attractive and instructive group of hardy plants. Boxes of cut Roses came from Mr W. Paul, and a group of remarkably well-flowered Azaleas from the Societies' garden at Chiswick. The liberal prizes offered for fruit and vegetables failed to attract many competitors; this, however, is rightly attributed to the backwardness of the season, of which complaints were to be heard on all sides. The class for Black Hamburgs was a fair one; but the white Grapes staged in the other classes were of very inferior colour, although said to be fit for the table. The first prize bunches of Black Hamburg, staged by Mr P. Edwards, Liphook, were rather loose, but in other respects were very good; and the same remark applies to those staged by Mr W. Johnstone, Bayham Abbey, to which was awarded the second prize. The only stand of Muscat of Alexandria was put up by Mr J. Maher, Stoke Court, which, although apparently unripe, secured that exhibitor the first prize. In the class for any other white Grape, Mr Atkins, Wantage, was placed first, and Mr P. Edwards second, both staging fair examples of Buckland Sweetwater. The competition in the classes for Pine Apples was very weak indeed, none of the fruit staged being particularly fine; and in one instance—that for two specimens—the first prize was withheld, Mr Rutland, Goodwood, being awarded the second for a moderate-sized Charlotte Rothschild, and a small Queen. Mr Rutland secured the first prize in the class for one Queen (no second was awarded), and was the only exhibitor in the class for any other variety, receiving the first

prize for a well-ripened Charlotte Rothschild. Mr G. T. Miles was the only exhibitor in the class for one Smooth Cayenne, and received the first prize for a good fruit.

Melons were staged in good numbers, and of good quality, the prize fruit being of fair size and well netted. Mr C. Deaven, Staines, was placed first for Windsor Gem, a seedling of his own raising; Mr J. Chilton, Setsworth, second, with Queen Emma; and Mr Goldsmith, Tonbridge, third, with Reade's Hybrid. One dish of Peaches and two of Nectarines only were staged. A dish of small fruit of Stirling Castle Peach gained Mr Maher the first prize; and the same exhibitor was first for Nectarines with very high-coloured and handsome fruit of Hants Tawny. Mr Nash, New Shoreham, was awarded the second prize for a good dish of Violette Hative Nectarine. Mr G. S. Miles met with no opposition in the classes for Cherries, and obtained both first prizes with excellent dishes of Black Circassian and Elton. Strawberries were well shown, notably the first prize collection of three varieties, consisting of Sir J. Paxton, Sir C. Napier, and President, staged by Mr Norman, Hatfield Park; and the single unnamed dish, apparently either President or Vicomtesse Hericart de Thury, staged by the Messrs Barnwell & Tilbury, Worthing. The best dish of Tomatoes was staged by Mr W. Iggulden, Romford; and the next best by Mr G. T. Miles. The former staged a good dish of Trophy, and the latter Stamfordian.

Mr G. T. Miles was awarded the first prize for a collection of new dishes of vegetables; and Mr Iggulden, the only other exhibitor, was a very good second. Mr Miles's collection consisted of Stamfordian Tomatoes, Queen Onions, Nantes Horn Carrots, Unique Peas, Canadian Wonder Beans, Veitch's Ashleaf Potatoes, Mushrooms, Broccoli, Tender and True Cucumbers, and Asparagus—all being creditable examples.

SOUTHERN CORRESPONDENT.



"JACK FROST" IN THE 'GARDENERS' CHRONICLE.'

WE have learned that "J. Downie's" signature was appended to the verses "Jack Frost," in the 'Gardeners' Chronicle,' by mistake of one of the officials connected with our contemporary, which led to an apparent plagiarism, and to its exposure in our columns. We take this opportunity of stating our belief that Mr Downie never intended the verses to appear with his signature attached to them.



Obituary Notice.

AMONG the many distinguished botanists and horticulturists who have recently been removed by death, few, if any among them, will be more regretted than the late Dr Moore of Glasnevin Botanic Gardens, Dublin, who died rather suddenly on Monday, June 9th. Dr Moore was a gentleman who was very widely known for his eminent talents, and respected by all who knew him for his unassuming genial nature. He was a native of Dundee, and began his horticultural career in the gardens of Camperdown, near that town. Like not

a few whose careers were afterwards very successful, he spent a few years in the then celebrated nurseries of Mr Cunningham, Comely Bank, Edinburgh; after which, in 1828, he went to the College Gardens, Dublin, to assist Dr Mackay, the then curator, whom he afterwards succeeded. From this position he was removed by being appointed curator and director of the Botanic Gardens, Glasnevin, which post he held for many years. As a botanist and hybridiser, as well as a cultivator, Dr Moore stood very high. He was a constant, successful, and hard worker in both the departments of botanical science and practical horticulture. No pains nor trouble did he shrink from to render his charge interesting and instructive, and for this purpose he travelled far and wide in almost every country in Europe. In 1865, the University of Zurich acknowledged his valuable services to science by conferring on him the degree of Doctor of Philosophy.

Calendar.

KITCHEN - GARDEN.

THIS month, especially towards the end, is generally considered the warmest of the whole season, consequently the greatest amount of moisture at roots of plants is required,—and when such is rendered necessary it is well to do the work on something like sound principles. We often see much time, labour, and expense wasted on watering by unskilful cultivators. And this is the least of the evil. Instead of rendering aid to the starving plants, much mischief is done, and often total destruction. The source of the evil is from the too frequent cause of pumping water from a well and carrying it direct to the plants. The word “plants” has a broad meaning,—vegetables, flowering-plants in beds and borders, plants in pots, shrubs, trees of ornamental character, and all that is connected with gardening; but at present we particularly refer to those placed in the kitchen-garden for culinary purposes. To be explicit, we would say, rather leave watering alone with vegetables than do it badly; but with water from a large tank, pond, or some other means of holding water till it is warmed by sun and aerated, great good can be done to roots and foliage. Let the surface be well broken, and during the latter part of the day (during the summer season) give such quantities as will reach well below the roots, making the ground saturated, and when the surface be-

comes dry enough to work the hoe, let it be thoroughly used all round the plants, taking care that any kinds which root near the surface are not injured; then, if convenient, and the material at hand, a good mulching with half-rotten litter (long grass or manure answers) will probably do all that is required during the remainder of the season. But in the majority of cases this is not to be easily had, and to make up for its absence frequent application of the hoe or prong, to keep a loose surface, will do much to meet the difficulties caused by drought. If seeds are to be sown, a good soaking to the prepared ground the night before the sowing is to be performed will give opportunities of raising seedlings successfully. This is very applicable when sowing Radishes, Cabbage, Turnips, and other small seeds. Shading with mats, branches of evergreens, and such-like, is often resorted to with success; but a thoroughly moist soil before sowing is very important. When planting, some are very careful to do the work during wet weather. We always prefer doing it during a period when the ground is neither wet nor dry. But this cannot always be the case, and the medium course is the most desirable. Roots of the Brassica kind of plants to be dipped in a thin puddle of cow-manure; light soil, and a pinch of soot, well mixed, is an old

practice, and with ourselves a practice which saves all the labour of watering. If the stems, well to the hearts of the plants, are immersed in this, they are likely to resist the attacks of grubs and snails. A handful of fine ashes mixed with a little lime and soot (guano with the ashes is capital for a double purpose) generally secures the plants against depredators. We can do little to check such vermin without dusting the whole surface of the ground under crop. Cracked and baked surfaces must be carefully guarded against. Very firm soil, which has been years under good manipulation and not manured at present, we are strongly in favour of when plants have to stand severe winters in such positions. The past winter has shown us that firm moderate growth is the most desirable in every case. Broccoli being planted out forthwith should not be of gross growth: and they are not safe in very loose rich soils. Get all and sundry of the winter crops out as early as circumstances will allow. Better to transplant thickly for a time on spare ground till the winter-quarters are ready, than to allow the plants to get weakened in the seed rows or beds. When such plants are carefully moved and transplanted at once during August, or even later, a firm growth is secured, which is likely to battle against frost or severe damp. Borecole (Kale) Cabbage (for Coleworts), Savoy, succession crops of Brussels Sprouts and advanced Cauliflower plants may all be planted without delay. Leeks, Lettuce for autumn, Endive for successions, Parsley to stand the winter, and Celery in well-manured trenches (single, double, or triple rows in a trench, as preferred), may be planted during the month. It is not so desirable, as in bygone days, to have large succulent Celery—firm, crisp, nutty-flavoured produce is more preferable. There should be few outside leaves to Celery, but it should be solid and firm. The red kinds, according to our experience last winter, stood much better than the whites; but some like the latter because of purity of colour: and the dwarf kinds of them are the hardest. Kinds pricked out to make a last planting for very late supplies should be now growing on a bed of very solid sweet manure, firm, and only a few inches deep. When watering is

done, let “dribbling” be looked upon as a “destroyer.” Manure-water to Celery gives crispness; and on dry soil applications of moisture is indispensable. Mulching is of much service in raising fine Celery. The material for the purpose may be rich short manure. Sowings may be made, as demands require, of Turnips, Carrots (for supplies of young roots), Radishes (Turnip kinds are now best), and Spinach (round kind), in the shade and between other crops. Peas may be sown in southern districts for a chance crop: dwarf kinds, which can later in the season have protection by frames or “protectors,” may be sown in favourable positions, so may also French Beans. Sow Parsley for winter supplies: choose a border where protection may be given during severe weather. Thinnings of Parsley transplanted now and kept well trimmed in till autumn, then allowed to grow, will be stiff and well prepared to stand a winter of severe weather. Cabbage is sown by many from beginning to end of month according to the district's latitude: from the 10th to 25th is a safe period, but by all means we would advise making two sowings: and the smaller portion of the seedlings do well when transplanted to stand the winter. In spring their value is often found out, if only to give to unfortunate neighbours, especially of the cottager-class. To great numbers we have often rendered assistance from this little auxiliary. This season, after supplying many, we thinned out the stock on the ground where they stood, and have had a capital succession to the main planting, which has been cut, and now turning in plenty of tender Sprouts, which we find are more valued by many cooks (especially French ones) than hearted-Cabbage. Keep down weeds everywhere by attacking them often, and before they become established. Seeding of weeds always increases the amount of labour, and is often of great injury to the crops. Staking and topping of Peas and Runners must not be overlooked: and get all ground filled with useful crops—as Potatoes, Beans, and Peas are cleared off.

Cucumbers on ridges require topping, thinning, mulching, and training. Gherkins and Vegetable Marrow should have attention in the same manner

before they become matted. Tomatoes require frequent attention, watering with liquid manure when plenty of fruit is set. Those in pots need rich surfacing, and should be allowed to root through into rich material. No useless laterals should be allowed to

grow, and the plants should be trained according as growth is made.

Manure for an early Mushroom-bed may be collected. Keep it free from wet and not allowed to exhaust itself. Gather and dry herbs in the shade.

M. T.

FORCING DEPARTMENT.

Pines.—If the weather should be such as is generally looked for in July, fire-heat even in the coldest localities will not be much required; and in the warmer parts of the country it will be almost entirely superseded by the more invigorating, because natural, heat of the sun. Still, if a time of dull wet weather should occur, fires must be lighted to keep the atmosphere in pits and houses from stagnating, and the heat from falling much below the maximum. Succession plants for fruiting early next season will, under favourable conditions, be growing very rapidly, and every precaution must be exercised to prevent them making a soft drawn growth. Liberal supplies of fresh air on all fine days is the chief agent in producing a robust and fruitful growth. As soon as the temperature touches 75° in the morning, give a little air, and increase it at intervals till noon, when, in warm calm weather, a free circulation of air should play about the plants. Syringe these every fine afternoon through a fine rose at shutting-up time, which should be sufficiently early to run up the heat to 85° for a time. The night temperature at 10 P.M. should be 75°, allowing it to fall to 70° in the morning. Owing to the backwardness of the season, some of the early Queens, which are generally all cut by this time, may be just finishing off, and can be removed to any cooler airy place when nearly ripe. The suckers of these will be ready by the middle or end of the month for being potted into 7-inch pots. When potted, plunge in a bottom-heat of 90°, and give them plenty of room. Shade for a few hours in the middle of the day, and keep them rather close until the first signs of emitting roots, when they should have a good watering and the shading be gradually discontinued. Fruit now swelling off may, if neces-

sary, be pushed on with a higher temperature than is desirable early in the season. Keep them well supplied with guano-water. Make the most of sun-heat by shutting up early, so that the thermometer touch 90° for a short time, with a thoroughly moist atmosphere. See that the pots are resting firmly in the plunging material, for if it shrinks from the pots the soil dries sooner, and much more frequent waterings are necessary, which is undesirable. Now is a good time to start a late batch of fruiterers for winter ripening. If, according to former directions, these have been kept cooler and drier for a month, all other things being equal, an increase of heat and moisture should now bring them into fruit.

Grapes.—We would reiterate former directions in reference to all Vines from which the Grapes are gathered, and urge the necessity of keeping the foliage healthy and active to the last. Give them occasional washings with the engine, and see that the borders are not dry. Late Grapes intended to hang late on the Vine should be examined, and if any of the bunches are likely to be too thick, lose no time in removing some of the berries. It is best to thin sufficiently at first, but it sometimes occurs that the rule is not applied to all bunches, and the sooner the defect is remedied the better. If this month should be dry, all Vines swelling off crops should be well watered either with liquid manure, or thorough mulchings of rich manure. Many Vines are starved for want of water in warm summers. Leave air on all vineries throughout the night. For night ventilation we prefer closing the top lights and opening the bottom ones. Muscats, even in favoured localities as to climate, should still have a little fire-heat at night and on cold cloudy days. As soon as any crop shows first signs of

colouring, give inside borders a good soaking; and the same applies to outside borders if the weather be dry. With a good mulching, a good soaking will carry them safely to maturity. Black Hamburgs should be coloured as slowly as possible at this hot season, and the vinery should never be closely shut up. Look over all Vines twice weekly, and remove all lateral growths as they present themselves. Young Vines intended to bear next year should be stopped when they reach to near the top of the house, and their lateral growths be limited to one leaf. Should they, however, be very vigorous, and there be any chance of their starting the buds on the main stem, let the laterals make two or more leaves for a time. Permanent Vines intended to be cut back will be all the better and stronger for being allowed to cover all the roof with side growths; for in proportion to the top growth will be the extent of roots produced. If pot-Vines for fruiting early next year have done well, they will now be strong canes with well-developed buds, and the bottom parts of them changing to a brownish hue. Give them an increased circulation of air, and do not let them make any fresh lateral growth. See that, now the pots are full of roots, they never get too dry, and expose them as much as possible to sunshine, so that the wood gets thoroughly ripened as early as possible.

Peaches.—Let crops that are colouring have abundance of air, and see that every fruit is fully exposed to light. Look over ripe crops every day, and gather those that are ready for table. Lay them on some soft material, such as sheets of cotton-wadding covered with tissue-paper. Give crops that are swelling off copious watering with liquid manure if the weather be dry. Syringe the trees freely every afternoon until the first signs of ripening. To keep the foliage of trees from which the crop is all gathered healthy and clean, syringe them frequently with a weak solution of soft soap. Keep them as cool and well aired as possible, and if the weather be dry and hot see that the borders do not become too dry. Tie in at intervals the shoots of young growing trees, and stop such as may be getting much in advance of

the others. Avoid crowding the trees with more shoots than are necessary to furnish them well.

Figs.—Keep a free circulation of dry warm air among ripening crops. Where the first crop is all gathered, thin out the second if there is more than the trees are likely to swell and ripen properly. Give the trees—if placed in restricted borders—good waterings of guano and dung water, never allowing the soil to become dry. Syringe frequently to keep red-spider at bay.

Melons.—Melons swelling off heavy crops require much more water and nourishment now than earlier in the season. The beds of those growing in Melon-houses should be top-dressed with rotten manure. Red-spider is apt to be troublesome, and the foliage should be freely syringed at shutting-up time. Very little fire-heat will now be necessary, except during a period of sunless weather. Expose ripening fruit as much as possible to the sun, and air freely, but do not allow the soil to become too dry. Impregnate succession crops as soon as they are in fit condition. Plant out, and sow for succession crops.

Cucumbers.—Plants in full bearing require liberal treatment at this time of year. Water them frequently with liquid manure, and put fresh mulchings of manure on the bed. Examine the plants occasionally, and stop young growths. Thin out a portion of the old shoots, to be replaced with young fruit-bearing ones. Syringe freely at shutting-up time, and let the temperature run up to 85° or 90° for a time. Cut the Cucumbers as soon as fit for use, and thin off all malformed ones, so as to prevent the exhaustion of the plants.

Strawberries in Pots.—See last month's Calendar. All plants should be in their fruiting-pots by the middle of July at the latest. In potting them, let it be done firmly, using a rather strong fresh loam with about a third of well-decomposed dry cow or horse manure and a little fine bone-meal. In placing them to make their growth, choose an open warm position, placing them on something that will prevent worms from getting into the pots. Give them plenty of room, and never allow them to suffer for want of water.

Notices to Correspondents.

All business communications and all Advertisements should be addressed to the Publishers, and communications for insertion in 'The Gardener' to David Thomson, Drumlanrig Gardens, Thornhill, Dumfriesshire. It will further oblige if all matter intended for publication, and questions to be replied to, be received by the 14th of the month, and written on *one side* of the paper only. It is also requested that writers forward their name and address, not for publication unless they wish it, but for the sake of that mutual confidence which should exist between the Editor and those who address him. We decline noticing *any* communication which is not accompanied with name and address of writer.

J. M.—From an examination of the leaves of your Vines we cannot discover symptoms to account for their coming so suddenly to a standstill and ripening their wood so very prematurely as you describe. Evidently, however, they must have got some sudden check, and the Hamburgs—being less robust in constitution than Alicante—have suffered most. Did you introduce any Vines among the old ones when you replanted? The roots and border being in such good condition would indicate that the cause was not there. But seeing the bad state you found them in, and considering the judicious course you have taken with them, they may ripen their crop and do better next year.

ALFRED LOW.—We have tried Speed's insect annihilator, and find its effects on mealy-bug, scale, and thrips, &c., to be exactly what is claimed for it. It is, moreover, so thoroughly safe an application, that to inexperienced amateurs especially it must prove invaluable; for it does not injure the tenderest plant when applied according to directions. The same we can also say of Speed's remedy for mildew, and its effects are instantaneous.

MAUDE.—The following *Violas* are all excellent for bedding purposes:—Purples, or Purplish Blues—Tory, Holyrood, Alpha. Yellows—Perpetual Yellow, Gem. Whites—Purity, White Perfection. We never recommend tradesmen in these pages. Apply to your ordinary or local nurseryman, who, if he has not got them, can easily procure them for you.

J. WILLS.—Owing to a press of matter we cannot make room for Report of the Proceedings at Albert Hall Meeting, &c.

A READER.—The greenhouse plant is *Abutilon Thomsonii*. The shrub was in so battered a state—in a dry wooden box, without any packing to keep it fresh—that all we can make out concerning it is that it belongs to the *Cruciferae*. Send fresh specimen, properly packed.

N. C.—It is not mealy-bug, but a small silvery-winged fly, that infests your Vine leaves. Tobacco-smoke destroys it; but be careful not to fumigate too strongly, or the softer-leaved sorts of Vines may suffer.

Several communications on heating by hot water must be held over till next month for want of space.



ERRATA.

In our report of the "Scottish Horticultural Association" in our May issue, *Pilea muscosa nana* is represented as having been exhibited by Mr Forman, florist, Dalkeith; the plant was however exhibited by Messrs Ballantyne & Son, Dalkeith.

THE GARDENER

AUGUST 1879.



MAKING AND PLANTING ROCKWORK.



THE making of rockwork on which to cultivate rock and alpine plants, and also as a feature of taste and variety in the garden, is a labour often undertaken, but one which is very difficult to execute. Legions of examples of rockwork are to be found all over the country,—indeed, in most gardens,—in more or less good or bad taste, from the offensive heaps of vitrifications from brick and glass works, to the admirable imitations of stratified rocks on a large scale executed by Pulham, with the assistance of the mason's art and plenty cement. Indeed, so good is the imitation that one might fancy the quarry brought bodily into the garden, as they move houses in America. The best specimens of artificial rockwork are generally to be found where the natural rock and rock scenery is most abundant—where Nature's materials are at hand, and where Nature is near to show the way. The worst specimens, on the other hand, are to be seen where the difficulties of site and materials are the greatest—where the products of the glassworks are pressed into the service, and where the site would be more suggestive of a brick-yard than of living rock. I think one grand flower-show at least can be remembered—an international one—where the rockwork was done in coke. Between Pulham, on the one hand, and the coke rockery on the other, there is room for many varieties of the art and mystery, and the gap is well filled up. When a rockery is to be made, there are two primary objects in view. The first is, that the fabric to be constructed shall be pleasing to the eye, and harmonise with the surroundings,—that it should not look toy-like, too artificial and incongruous, but be an agreeable feature in the garden; and the second is, that it

be so constructed that it shall be suitable for the growth of the plants desired to be cultivated. A rockery may be a first-rate imitation of a real rock or cliff, showing the dips, stratification, and other features, and yet offering but small facility for the introduction of plants, thus favouring one of the objects at the expense of the other—just as magnificent conservatories are sometimes built in which plants can only languish.

In order that a rockery may not be an offensive or incongruous object, the site must be well chosen. Pyramids of stones on a flat surface, an amphitheatre, symmetrically arranged, fronting a shrubbery or in the corner of a terrace, or in any geometrical position adjoining buildings, are instances of positions where rockwork would be out of place. But given an abruptly sloping natural declivity—if adjoining water all the better; and if the aspect can be varied by bending round an angle, better still—there a rockery may be made. The site may even be artificially improved in deepening the slope, by adding to its height with soil or planting. We do not think that it is at all necessary that a rockery should be an exact copy of nature in any of its forms—either of stratified rocks or the many forms in which the detritus of rock is found. A tasteful piece of rockwork may be made without any very close imitation of nature,—just as a landscape can be thrown on canvass by the painter which at once pleases the eye of taste, artificial though it be, by the truthful look there is about it. A certain amount of Nature's guidance must be admitted, as a matter of course; for instance, irregularity and variety, as if by chance, an orderly disorder—like Hamlet's madness, "there must be method in't." The materials must be natural fragments of rock—not water-worn stones, or stones with every indication of the quarry about them: unstratified rock we like the best. These can be so arranged that an endless variety of little terraces and recesses, and pockets and ridges, from base to summit of the position, can be made to suit any variety of plants, from the shallow-rooting Saxifrages to the deep-rooting Gunnera. Overhanging ledges can be made, with recesses for shade-loving plants. In short, in the construction, our second object proposed—that of preparing suitable positions for the plants desired to be cultivated—must ever be kept in mind. The most of our European alpine plants require a permanently moist soil, as every one knows who has trudged the mountain slopes in search of plants; although many do prefer a scanty soil on cool rocks,—which means that no position exists which may not be selected by some plant where to live and thrive, as witness the stone-and-lime wall seen from our window, covered with *Aspleniums*, and *Scolopendriums*, and *Ceterach*, and *Drabas*, and *Linarias*, and many more things equally green, if with names more homely. Some require the cool moisture of running water always among their roots, as the *Parnassia*, *Narthecium*, or *Pinguicula*; and if a trickle can be conveyed over some part of the rockwork, it will be the one source of success in many instances. Some

will require a sharp shingly soil, as the *Dianthus*, which can be supplied in the shape of the smaller broken chips of the rock, giving an opportunity of varying the construction of the surface. Some plants require a stiff holding soil, such as the *Primulas*, which can be supplied in little flat terraces formed to catch all the rains. Others, as the dwarf *Veronicas*, such as *taurica*, will thrive on dry sloping ledges: the various *Thymes*, *Aubrietias*, *Erodium*, and some *Geraniums* are of this class. Many of the smaller shrubs are most appropriate as rockery plants. *Ivies* of the finer class, such as the variegated, may be made to creep over large blocks, or the pretty *Ampelopsis Veitchii* in the same way. *Muhlenbeckia complexa*, which has stood the late winter on the rockery, is a choice plant for fringing a ledge. The *Kilmarnock Weeping Willow*, in a dwarf form, will spread its long slender branches over a peak of rock, as well as the *Savins* and *Periwinkles*, *Helianthemums* and *Genistas*, and many more of a woody nature. In writing the foregoing, we have supposed the formation of a rockery on a somewhat enlarged scale; of course, the extent and form of the rockery must be determined by the requirements of the owner, and the nature of the position to be occupied. It may be of a curved form either outwards or inwards, it may be of a long ridge shape and undulated, or it may be in the form of a group of hills and valleys, and need not after all cover an extravagant area, and need not require by any means an extravagant amount of stones. One of the best managed of this last kind we have seen is in the grounds of the Down House, Dorset—the scale not very large. Whatever be the shape, if the rockery has any pretension to be anything more than a toy by the side of the walk, provision must be made to give access to the different parts, in order to be able to clean it and attend to the plants, and particularly that the owner may conveniently at any time enjoy an examination of his plants. This can be managed by introducing a pathway, curving and undulating about, among the compartments of the rockery. These pathways can be made a feature of the rockery itself, and far from spoiling its appearance, can be made an improvement. The pathway itself, of course made with pieces of rock, should be planted with *Sedums*, or *Stellaria*, or prostrate *Pyrethrum*, or any creeping plants not easily destroyed.

Sometimes a rockery can be made more imposing, if the scale is large, by having groups of the smaller *Pines* planted on the higher parts, such as *Pinus Pinea*, *Abies orientalis*, or any of the dwarfer pendulous forms of *Abies excelsa*, or plants of the common *Sumach*, *Spiræa Lindleyana*, or indeed any of the *Spiræa*, where they would not interfere with the wellbeing of the choicer plants below.

When a rockery abuts upon grass, it is always well to have a narrow margin of rough gravel following the undulations of the base, for the sake of tidiness.

NOTES ON DECORATIVE GREENHOUSE PLANTS.

THE CYCLAMEN.

WHAT a treasure we have in the Cyclamen as a spring-flowering plant! The handsome form of its flowers, the variety of its colours, the beauty of its foliage, and its free flowering, as well as the enduring quality of its flowers, combine to render it one of the most useful spring greenhouse plants we possess. As a house plant, it is in great request, and its flowers continue fresh a long time when gathered. It is a very easy plant to manage, and though we very often see it with long straggling leaves and flowers, this is the result of improper treatment. Formerly it used to be the custom, in growing Cyclamens, to ripen them by withholding water from them nearly if not altogether: this was called "drying them off," and then they were laid away on their sides, under some greenhouse stage or other out-of-the-way place, until the time for starting them came round again. A better and more common-sense system now generally prevails, however, and the plants are benefited accordingly.

Under the old system, we have seen the corms grown to an immense size: at one place in particular we recollect noticing a great many that measured from 6 up to 10 inches in diameter, the larger size being grown in 11 and 12 inch pots. They produced an immense quantity of flowers, but generally small, and not well formed. A great improvement has taken place in the varieties, as well as in the mode of cultivation, some of the newer kinds being exceedingly beautiful. Such good kinds can now be raised from seed, that most growers raise a few in this way annually, and with them replace the older plants, which are now seldom kept longer than three or four years at most. They are about at their best when three years old. Good seed can be had from most of our seedsmen, though some of them make this and kindred subjects a speciality.

Having procured good seed, sow in February, in a well-drained pan, and in a mixture consisting chiefly of leaf-mould and sand: cover with a piece of glass until the young plants appear, when the glass must be removed, and light admitted freely. From their earliest stage they should be placed in the light and near the glass. When the young seedlings have made two leaves, pot them off singly into small pots, using the same mixture, with a little good loam added. It will be an advantage, in regard to moisture, to plunge the pots in a box of sawdust, or something like that, and kept in a growing temperature of about 60°. When they have rooted nicely in these pots, they may get a shift into 4-inch pots, using richer soil, made so by the admixture of well-rotted cow-dung or bone-meal.

They must still be kept in heat, and attended to in the way of water, so that they do not receive any check to their growth. About the beginning of May they may be gradually hardened off by inuring them to a cooler temperature, but still giving sufficient water; and about the middle of June turn them out into a cold frame, plunging the pots—or, what is equally as good, if not better, plant them out into good rich soil, keep them well aired, even removing the lights altogether on good days, but run on again at night, or during heavy rain. They must be potted up again about the middle of September, using 4-inch or 5-inch pots, according to the size of the plants. They must be returned to the frame for a week or two after potting, and shaded slightly from the sun, until they begin to make fresh roots, when they must get plenty of light and air, or transferred to a pit where they can be kept near the glass and well aired. We do not believe at all in the drying-off process; they should always be kept growing. The treatment during the second and succeeding years will differ but slightly from that already described, and therefore need not be repeated.

Those who have not the command of heated structures, but may be in possession of a greenhouse and a frame or two, may still manage to grow a few *Cyclamens* by sowing the seed early in June, and place it in a frame, or in the greenhouse,—the young seedlings to be potted off when fit, and transferred to the frame. Only they must not be potted into larger than 3-inch pots, and not planted out, but kept and wintered in this size of pot; and in spring, after they begin to make fresh growth, they may be shifted into larger pots, the after-treatment being also similar to that described above. The only difference between this mode and the other will be, that it will require from eighteen months to two years to get them into flower. They should be wintered in a temperature of about 50°, and kept in a moderate state as regards moisture.

J. G., W.



DWARF POINSETTIAS.

THERE is such a run on dwarf plants of bright colour for table use and other purposes of furnishing in winter, that it is well to remember at the present season how simple it is to accomplish work that may be of paramount value to the gardener during the winter months. About the second week of next month (August) is a good time to take cuttings of Poinsettias, in order to have plants from 1 foot to 18 inches high. The tops should be taken off the strongest plants, or, if there be two stems from the same plant, one may be cut for the purpose indicated, and the other may be allowed to grow on; in any case, the

stronger the top is when it is cut over, the finer will be the floral bract—that is, assuming that the cuttings are judiciously managed during the rooting period. The only difficulty in this system of raising dwarf plants is in retaining the foliage during the rooting process. If the tops are strong and vigorous, the leaves are naturally so too, and are liable to fall off immediately if they are exposed to the sun only for a moment, or if they are kept in a low, dry temperature. The practice we adopt is to have a warm bed prepared beforehand, and to insert the cuttings either in small 60-sized pots or into 4-inch pots at once. If the former course is adopted, the cuttings are inserted at the sides of the pots, in an open mixture of leaf-mould and sand, and plunged at once into bottom-heat, and kept well shaded and syringed until they are nicely rooted, when they are shifted into 4 or 5 inch pots, giving them a strong compost, and shading them for a few days longer to make certain against checks.

If the cuttings are put into 4-inch pots and intended to remain, the pots are filled with a rich, generous soil; and in putting in the cuttings a layer of sand is put at the base of each, to encourage and expedite the emission of roots, which soon takes place at this season.

After the plants are fairly rooted, they still require careful attention in the way of shading, syringing, and watering, should the weather continue as fickle as it is at present.

They should afterwards be kept on a shelf near the glass, in a temperature not lower than from 55° to 60°, until they begin to show their floral bracts, when they will be considerably improved by plunging them in a bottom-heat of from 75° to 80°, and watered with liquid-manure occasionally. Two years ago we were very successful in raising a large batch of these plants, with bracts varying from 12 to 16 inches in diameter, which rendered us good service in a variety of ways during the winter.

CULTIVATOR.



STOVE-CLIMBERS.

STEPHANOTIS FLORIBUNDA.

AMONGST sweet-scented flowering-plants the *Stephanotis* still holds a prominent position, whether for the embellishment of ladies' hair or for bouquet-making; and as a plant for the exhibition-stage it has no equal. Its pure waxy-white flowers, and the fragrant perfume they possess, render it an attractive object in whatever way its ever-welcome flowers are used.

The *Stephanotis* is very free-flowering when under good cultivation, and deserves to be grown in every garden of any pretension. An erroneous idea is, however, entertained by some growers that this plant requires a strong moist heat to grow well and to produce flowers of first-rate quality. Under such cultivation the plant will grow with

great rapidity, but the crop of flowers will only be moderate in comparison to the amount of growth made. Yet this rapid-growing system is not to be altogether condemned, especially if the aim of the grower is to get a young plant into as large a size as quickly as possible. Yet if flowers are the main object from the time the plant is in a very small state, the greatest return will be produced by growing the plant in an intermediate house, under the influence of light, sunshine, and abundance of air on all favourable occasions.

The *Stephanotis* enjoys a drier atmosphere to grow in than a great many plants. The blooms are produced from the young wood; and light and dry air are of real importance to solidify the growth as it is made. An abundant harvest of flowers will reward the cultivator if these conditions are strictly attended to.

The *Stephanotis* is a valuable climber in an intermediate or cool stove, and will ramble with great freedom over the roof. For exhibition purposes it can be taken down, if grown in a pot, and trained round a balloon trellis, or in any other shape that may be deemed necessary. When wanted for this purpose, the young shoots are best trained on small string, which can be cut down when ready to be placed on the trellis. They are very much inclined to curl round the string or wire, and are very liable to be broken when untwisting them. If grown in a very strong heat, not only is the blooming capacity of the plant rendered deficient, but it becomes a prey to insects, more particularly mealy-bug, if any exist in the house in which it is growing.

Propagation is effected by means of cuttings taken off soon after the plants have commenced to grow, and these strike freely plunged into a brisk bottom-heat. They are best inserted singly in small pots, using a mixture of peat and sand. When the cuttings are well rooted, and the roots have reached the side of the pots, they should be transferred into 3-inch pots, in a compost of two-thirds peat and one-third rich fibry loam, and with sufficient sand to make the whole porous. They should also be supplied with a small upright stake, and again returned to bottom-heat, and kept close until they begin to grow freely. While in this position the young plants will grow rapidly, and will soon be ready for larger pots; 6-inch pots will be the next suitable size. Three or four small stakes should be placed round the sides of the pot to train the young shoots to, unless the position affords an opportunity to train them underneath the roof.

If grown in a strong brisk heat, the young shoots will make exuberant growth, and may, as soon as they require another shift, be transferred into 9 or 10 inch pots. This size will be large enough the first season. Supposing the plants have been trained round stakes, they should now occupy a position near the glass, and must have their shoots trained out thinly to get the full benefit of light. By the end of the season they will have travelled a long way up the roof of a good-sized

house. We might here say, if bloom is the object the second season, the plants, when well established in 9 or 10 inch pots, must be placed in a little cooler quarters, where they can receive plenty of light and sunshine, and a drier atmosphere than the one in which they have been growing during the summer.

The *Stephanotis* will winter safely in a temperature of 45° to 50° , provided the atmosphere is dry and the plant not too wet at the root. We are acquainted with a large plant "planted out" that is subjected to a much lower temperature than the one named in winter—although it starts slowly into growth in the spring, and its growth during the season is much shorter than if grown in a warm house. Nevertheless the plant under these circumstances produces every year an enormous quantity of its fragrant flowers. This plant is much more hardy than is supposed by many. To test its hardiness, we early last season moved a plant to a situation where we allowed the thermometer to fall on several occasions last winter to 33° , and allowed it to start again in the same amount of heat as an early peach-house when first started. The plant did not die with this severe treatment, but lost a great many leaves, and a quantity of the young wood died back. The plant in question was long in starting, but at last broke into growth, and commenced showing flowers from every joint, which were only about 1 inch apart. We may safely recommend it as a conservatory climber where a moderate temperature is kept for seasonable flowering plants in winter—viz., 45° to 50° .

We do not recommend such a low temperature for a young plant unless, as has been said, bloom is the object. If, on the other hand, the young plant is kept in a stove-house all winter, and in February transferred into a size larger pot, using the same compost as before recommended, the first season's shoots should have the unripe ends cut off, and be laid horizontally to the right and left of the pot. By so doing, a young shoot will start from nearly every leaf, and cover a good space before the end of the season, if placed when potted in February in an 11 or a 12 inch pot. This size will be large enough for the season, if liberally supplied with weak manure-water when full of roots. The object now is abundance of bloom the following June or July, and the cultivator must get the wood thoroughly ripe before the dark days of winter set in, by allowing the plant abundance of light, which it should enjoy at all seasons, and more air, a drier atmosphere, and wintered as advised. When started again into growth at the commencement of the year, and the young shoots as they grow trained close to the glass, provided the plant is not excited with too much heat, but allowed to develop its shoots under favourable conditions, and a too close moist atmosphere avoided,—these few particulars attended to, the plant will not fail to produce its fragrant flowers in great profusion. If required for exhibition purposes, the plant will stand retarding or bringing on rapidly, as the case may be. It is advisable, when required for this

purpose, not to put them on the desired trellis too early—that is, until the flowers are well advanced ; they can then be regularly arranged over the whole trellis.

DIPLADENIAS.

This lovely genera of plants ranks amongst the most beautiful of stove-climbers, and deserves to be grown largely on the roof of a plant-stove, where plenty of heat and moisture can be afforded them. *Dipladenia Brearleyana* makes one of the finest exhibition plants. However beautiful the older varieties of a few years ago were, they are certainly superseded by the newer varieties. *D. amœna* and *amabilis* are beautiful ; while *D. insignis* is a great acquisition, with its rich rosy-carmine flowers, which are of a good size, and having a white tube or throat, renders it an attractive plant for exhibition purposes. *D. regina* will undoubtedly, with its light-coloured flowers, prove to be, from its free-blooming habit, a great acquisition.

We intend to confine our remarks to that beautiful evergreen plant *D. Brearleyana*, which we consider far exceeds any other variety, either as a stove-climber or for exhibition purposes, both in freeness of growth and for its floriferous character. Cleanliness is a point of great importance in the culture of this plant, as it is very subject to all kinds of insects which infest plants, especially mealy-bug ; and unless the plants are free of these, little success can be anticipated. When once attacked with bug, it in a very short time arrests the growth of the plant, and the foliage soon turns yellow and falls off.

Watering is another particular point, and this plant is very impatient of carelessness in this respect ; it cannot bear being kept so wet at the root as the majority of stove plants. If the waterpot is judiciously used, and the plant kept clean, combined with light, heat, and moisture, the cultivator will not fail to be successful with *D. Brearleyana*, and have a quantity of large, fine-coloured flowers of great substance. This magnificent hybrid is a very attractive and striking object when in flower, from its peculiarity of having flowers of two colours on the plant at the same time,—opening as it does pink, and then with age the colour intensifies until it is of the richest crimson. This variety flowers very freely. It, like several other stove-climbers, requires a large number of young shoots to be trained under the glass before a great profusion of flowers can be produced at one time. This is particularly necessary if required for exhibition purposes. Like the *Stephanotis*, it is best trained on string for that purpose, until the flowers are well advanced. They should then be carefully trained round the trellis they are intended to be exhibited on, placing the flowers as near equal distances from each other as possible. *Dipladenias* cling to the support upon which they are trained. When trained on string, it can be cut in short lengths, and easily drawn out, making it more convenient to take the plant down when it has to undergo the ordeal of clean-

ing. The young shoots are sure to be injured more or less if allowed to twist round wires.

Dipladenias do best when allowed to ramble and twine to string at will. Care should be taken that each shoot, if only a few inches apart, is supplied with a separate support.

Propagation is best effected by means of cuttings in the early spring. The young wood, when a few inches in length, will strike freely if numbers are inserted in a 6-inch pot, or singly in small pots, and plunged in brisk bottom-heat, and a bell-glass placed over them. When rooted, the young plants should be potted in small pots; if rooted singly in small pots, so much the better. If, on the other hand, a number are put in one pot, they must be potted as soon as the formation of roots has commenced. Care must be taken of the young plants after potting; if they receive a check, they do not start into growth for a very long time, and in some cases do no good afterwards. They must be grown on in bottom-heat, and liberal attention bestowed on them. They will grow rapidly when once fairly started; and by the end of the season will make nice young plants, provided they are rooted early, which is important. The young plants are best in a temperature during winter of 58° to 60° , according to the external atmosphere; and then with increased light and moisture, after the commencement of the year, the young plants will soon start freely into growth. If the plants grow well the first seasons, they will before winter be well established in 6-inch pots. After they begin to root freely, they should be transferred into 8- or 9-inch pots, using a compost of two-thirds fibry peat, one-third of fibry loam, with lumps of charcoal mixed, a dash of small bones, and plenty of coarse white sand to keep the whole porous.

The wood made the first season should be laid as much horizontally as possible, so that as many young shoots can be encouraged to lay a proper foundation for a good quantity of wood the following season. As the young shoots extend themselves, they will show flower-spikes from the axils of the leaf, and as they continue growing, will keep flowering over a lengthened period of time. Should it be deemed necessary to repot the plant a second time in the season, if the 8- or 9-inch pots are well filled with roots, and the plant is making rapid progress, the operation can be performed, but not later than the middle of July, so that the plant will be thoroughly established before the winter sets in.

Another particular point that must not be lost sight of in the successful management of *Dipladenias* is, they do not like being disturbed at the roots. In repotting, the crocks only must be carefully removed, and any loose soil that may exist on the surface of the ball. If the soil recommended is of a good fibry nature, and sufficient materials used to keep it open, the watering carefully attended to, which is absolutely necessary, the compost will not be in a sour condition for a very long time.

Although the *Dipladenia* cannot be used for all purposes, it is not only a worthy subject of the exhibition-tent and stove decoration, associated with *Allamandas*, *Clerodendrons*, &c., but it is useful in a cut state for shallow vases or dishes : mixed with these and *Gloxinias*, with a little *Fern* intermixed, *Dipladenias* are useful and striking.

WM. BARDNEY.

NORRIS GREEN.



FRUIT-CULTURE.

IN the July number of 'The Gardener' there occurs the following passage by Mr Hinds in connection with this topic : "I am ready to yield to every grower what I claim for myself—viz., that of knowing my own wants and circumstances best, and therefore that I have a right to choose for myself whatever course seems best to adopt ; but the aspect of affairs is altered if I recommend for general cultivation what is in fact but a foible of my own." Now there is nothing whatever to complain of in this excellent "piece of morality." The passage is worth remembering by us all, and if I make use of it here in a way that is not particularly acceptable to your correspondent, he has himself to thank for it. Let your readers turn to Mr Hinds's calendarial writings on "Strawberries" in the 'Gardeners' Chronicle,' and see for themselves how his precept and his practice correspond.

Not to go back more than the last few weeks, he has in one place sarcastically described those who differ from him in his peculiar notions as following "the practices of their grandfathers ;" in another place he has referred to his neighbours as pursuers of "the merest phantoms," which are not "resorted to where high-class gardening is carried out ;" and again, he has broadly accused his compeers generally of ignorance how to grow certain Strawberries that did not suit "their wants and circumstances,"—informing them in the most courteous manner that those who condemn such and such varieties as do not find favour with *him*, "do so because they do not know how to grow them" (!). These are some of the examples of toleration towards his neighbours that Mr Hinds sets when he has "a foible of his own" to recommend. In his paper in 'The Gardener,' he says "Black Prince Strawberry is not worth growing after February." After that date, however, I can grow plenty of berries of it 5 inches or more in circumference ; and I have sold it, as I can prove, in April at from 15s. to 25s. per pound. Were I to apply the same test to Mr Hinds, therefore, that he is in the habit of applying to his neighbours, I might very justly say that he condemns Black Prince "because he does not know how to grow it." Except it be the market-growers, who grow Sir Charles Napier for its appearance sake only, Mr Hinds stands alone almost among private gardeners as its champion.

And now I am going to analyse one or two of Mr Hinds's "foibles" in Strawberry-culture, which are so much superior, according to his own account; and I think I will show before I have done who it is that follows the practices of their grandfathers, and "pursue phantoms," &c. &c.; and moreover, that Mr Hinds has not apparently made up his own mind on the subject of which he writes, and which I imagine to be an essential qualification in those who aspire to teach others their duties. In 'The Gardener' some time ago, and in the 'Chronicle' lately, he has, as usual, been correcting "a fallacy" of his neighbours'. This "fallacy" consists in supposing, according to Mr Hinds, that Strawberry plants for forcing can be got up properly in less than two years. Most, indeed all, Strawberry-growers raise their plants and force them at the end of the same year and beginning of the next; but if Mr Hinds wanted plants to force—say in 1881—he would begin to propagate stock in 1879. In case I may be credited with exaggerating, I will give Mr Hinds's own directions. In preparing plants for forcing he "every year," layers in pots plants which he does not force that year but plants out in August. If these show a crop of fruit the season following, he cuts it off and *reserves the plants for producing runners for forcing exclusively*, which runners are layered in turn and forced the succeeding year. Thus he occupies a piece of ground to no purpose for a whole year, and to accomplish that which any other Strawberry-forcer accomplishes equally well in one year! and this is the practice recommended in the 'Gardeners' Chronicle' by one who accuses his neighbours of being behind the times! Like most Strawberry-growers, we also make autumn plantations, but not every year, nor yet with the special object of getting runners from them, but for a crop. At the present time our autumn-planted runners are producing an enormous crop—nearly 200 berries to each stool. These, if we followed Mr Hinds's advice, we should destroy, and keep the plants for next year's forcing-plants—1880! If Mr Hinds had anything to show in support of the practice he advocates, it would be different, but he has not. We have seen the best forced fruit he was able to produce at the most favourable season of the year, both pot-plants and gathered fruit, and while we quite willingly admit it was good, still it was no better than that of his neighbours, and certainly not so fine as many examples we have seen by other growers who propagated their plants in a much speedier manner. But the queer thing about Mr Hinds's practice is, as he tells us, that his object is to procure runners earlier than he would otherwise do. "Earliness in procuring the runners is an object always to be aimed at." Old forced plants planted out, he says, do not produce runners early enough—not so early as his autumn-planted runners, which must at that rate put out runners very easy indeed; but after all this trouble in getting runners so early in the season, what does he do with them when he has them? Why, keeps them till the end of July, when most people

have their stock potted and growing. His objections to potting even his earliest plants before the middle or end of July are that the plants get too much pot-bound ! In all our experience we never heard of a gardener complaining on this head. To have the roots in a matted condition that one could almost play at football with them, we thought, was the aim of every one who understood their culture—but we live and learn, or rather unlearn !

As regards Vine-leaves and their size in relation to fruitfulness, Mr Hinds is just as unfortunate as he is about Strawberries. He “can prove,” he states, “that the roots are in the *worst possible* condition (!), and the Grapes far from being what would be expected,” when they produce fine leaves ; but his statement simply proves that he is without experience as to all the conditions under which large and fine foliage may be produced for many years in conjunction with unfailing and heavy crops of fruit of the first quality. Our own motto is, “Get good foliage—the larger the better if matured—and the fruit will take care of itself,” and that motto I have never had occasion to alter, as I could show your correspondent at the present moment, and could have done for years back ; but I can furnish him with evidence that he will perhaps be more disposed to credit.

The first lesson I received on this head was at Dalkeith about 1856 or '57. At that period there was a house of pot-Vines there bearing one of the finest crops of Grapes I ever saw. This house is alluded to in Mr Thomson's book on the Vine. The plants were the admiration of all who saw them, and the leaves were as remarkable as the fruit—some of them, if I remember correctly, measuring 14 inches or more in diameter, and samples, I think, were sent by Mr Thomson to Dr Lindley, then editor of the ‘Gardeners’ Chronicle.’ The next example was at Floors Castle, during the late Mr Rose's time. I did not see them myself, but I remember well Mr Thomson saying of them that a finer crop or finer berries in all respects he never saw, and that the Vine-canes and the foliage were equally remarkable for their size and vigour. In either of these cases will Mr Hinds venture to say that the Vines were in the “worst possible condition” ? and will he tell us why, if a pot-Vine may have large leaves with advantage, a planted-out Vine may not ? There are conditions in which big leaves may not indicate good crops, as Mr Hinds's experience seems to confirm ; but when leaves and wood are well ripened, as they can be, the stronger they are the better, and all practice and theory corroborate this view : and I ask Mr Hinds to point to one single example, if he can, of a fine crop of large bunches, well finished, that were not accompanied by good foliage of proportionally large size. All the large-bunching varieties of the Vine like the Barbarossa and Syrian, or large-berried like the Gros Colman, Golden Champion, and Duke, produce extra large leaves, as is well known ; and the first sign of a good crop on any variety, other things being right, is large leaves and good wood. I

may just state, in conclusion, that the reason I have taken notice of Mr Hinds's paper is, that though he does not name me, I was a principal party in the "discussion in a contemporary" to which he alludes, and which it would appear induced him to pen his "Remarks on Fruit-culture."

J. S., W.

P.S.—The following are the dimensions of Vine-leaves here on different varieties : Hamburgs, 14 and 15 in. ; Golden Champion (monstrous berries), 14 in. ; Duke, 13 in. ; Golden Queen, 14 in. ; Venn's Muscat, 13 in. ; Gros Colman, 14 in. All the Vines, Hamburgs excepted, are growing in an inside border exclusively, and in an impenetrable bottom ; and all are carrying heavy crops without a bad berry in the lot, and the Hamburgs have been doing so for twelve years constantly. Golden Queen, Venn's Muscat, Gros Colman, and the Hamburgs are carrying a crop, as near as I can estimate, probably very little, if any, under 30 lb. to the 19-foot rod, and many bunches were cut off. Royal Muscadine, with fine leaves of its kind, is bearing at a not much less rate ; and the bunches, not yet finished swelling, measure 9 inches in length and 8 inches across the shoulders. All the Vines are planted about 22 inches apart. Black Hamburgs nearly ripe and colouring quite black ; berries generally about 1 inch in diameter. Having given the size of the leaves, I think it necessary to furnish these particulars as well. The leaves, I should also say, are the largest on the Vines, and are from the laterals and main rods both. The pot-Vines at Floors bore 14 bunches each ; and at Dalkeith the plants mentioned occupied a pit 30 feet long by about 7 feet wide, and bore 200 bunches.—(See Book on the Vine.)

J. S., W.



THE AMATEUR'S GARDEN.

THE CABBAGE FAMILY.

NEXT to the Potato in universal estimation stands the Cabbage, and there is good reason why this should be so. Good varieties properly grown furnish delicate, wholesome, nutritious dishes every day in the year. Professor Johnston says that the Cabbage is so rich in flesh-forming matters that, beat up with Potatoes—which are deficient in flesh-formers—it makes a dish equal to oatmeal-porridge.

To keep up a succession of Cabbages over as great a portion of the year as possible, at least three or four sowings must be made. For the very earliest, a sowing must be made from the 20th to the end of July, according to the season and locality. In northern districts the first date is the proper one ; and in the sunny south, even the beginning of August is soon enough. The plants from this sowing require to be transplanted to their final quarters in September, or sooner if they are fit. A sheltered sunny spot should be chosen.

The second sowing should be made from the 6th to the 20th of August. The plants from this sowing are not to be finally transplanted until the following spring; but it is a good plan to prick them in a sheltered spot on not too rich soil, as we have often noticed that pricked-out plants—*i.e.*, transplanted closely together—stand severe winters better than plants that are left in the seed-bed. One reason for this is, that the stems are less exposed than when not transplanted, and the operation causes a little check, which induces a harder growth. The third lot should be sown in March, and the fourth in May. Both these lots had better be pricked in soil in which some rotten manure has been mixed, so as to produce strong plants with plenty of fibry roots. Such plants, when lifted with a trowel and planted in showery weather with a ball of earth, give better results than when the plants are allowed to grow crowded in seed-beds, and afterwards pulled out and stuck in with a dibble. The plan of raising plants to secure a succession which we have recommended applies to the tender early varieties, of which Little Pixie may be taken as a type. We are aware that a succession of Cabbages is kept up in amateurs' gardens by growing early, late, and medium kinds; but we advise those who wish fine Cabbages for the table to grow no late drumhead varieties at all. They are very inferior and very coarse, and occupy so much space that the ground on which they are grown is next to wasted, as they are seldom used; and they are, moreover, a very exhaustive crop to the soil. By the plan we have recommended, a supply of Cabbages can be had from the end of April up till mid-winter of the finest kinds. A plan, not so often followed as it might be with profit, and which secures good dishes all through ordinary winters, is to pick the leaves off the earliest batches as they are cut, and to give a good mulching of rotten manure and plenty of water. This causes the old stumps to grow again and to produce a crop of small Cabbages, which are often preferred to the ordinary heads. We may add that all the Cabbage tribe requires liberal treatment in the way of manuring and deep digging; and in dry seasons, or on thin soils, mulchings of manure and soakings of liquid-manure.

*Savoy*s take the place in winter which Cabbages occupy in summer, and are preferred by some. Two sowings of them are enough—one in August along with the Cabbages sown then, and another along with the first batch of spring-sown Cabbages. The autumn sowing requires transplanting in spring, and the spring sowing in showery weather, as soon as the plants are strong enough. The other remarks on the cultivation of the Cabbage apply in this case also.

Brussels Sprouts.—To have these as good as possible, they should be sown in a frame, or under a hand-light, in February, to get the

plants as forward as possible, so as to give them the full benefit of the *whole* season to grow. This advice may be disregarded in good climates, but in cold northern localities it is of very great importance. When no other means exist for raising plants, they must just be sown under the most favourable conditions possible, using rich soil; and this applies to the raising of all the plants of this class in early spring—but by no means to those sown in autumn, as it is apt to induce a growth too tender to stand the severities of winter. As we advised when speaking of Cabbages, so we advise in this case—prick out the plants 3 inches apart in rich soil, and lift and transplant with the trowel. It is more than worth all the trouble.

Curly Greens may be treated as recommended for Savoy, or, indeed, may be sown late enough to be ready in time to fill ground which is cleared of early crops of Spinach, Turnips, Potatoes, &c. The tops can be used in winter and early spring, and the stems will afterwards furnish a spring supply of tender sprouts.

Cauliflower for a first lot should be sown from the 10th to the 20th of August, and afterwards protected with hand-lights, or in frames, in boxes, or otherwise, as necessity may suggest, during winter. Give them air on all favourable occasions, and give the extra protection which a mat affords during frosty weather. Plant these out in rich soil when the weather has become spring-like in March or April, and give them a little protection by means of inverted flower-pots, boxes, or even evergreen twigs, on frosty nights. Another sowing may be made under glass about the beginning of March, and afterwards nursed on in a frame or under a hand-light to succeed the autumn-sown ones, and another towards the end of March out of doors, and a third about the 1st of May. A small pinch of seed each time will suffice. All the Cabbage kind require rich soil and liberal treatment to do them justice, but none more so than the Cauliflower.

Broccoli comes in when other vegetables are scarce, and is much appreciated on that account. Small growers do not need more than one sowing, and the best time to sow is about the end of March or beginning of April. They may be treated much in the same way as the others—only, do not manure the ground heavily, as too rich soil causes too luxuriant a growth, which is often damaged during winter. When a gross growth does ensue, it is a good plan to lift the plants and heel them over with their heads to the north. This operation is done by taking out a trench on the north side of the rows, and lifting the plants carefully and laying them in it, covering the stems up to the base of the fresh leaves; then another trench and another row of Broccoli, until the plot is completed. Those which show head during severe weather should be lifted and put where they can be protected,

or protection may be afforded where they stand. The sprouting varieties are very prolific, and the most profitable kind to grow, but the Cauliflower kinds are much more delicate in flavour.

So far we have treated of the times and ways of sowing and planting. As they are very similar in their wants, we will sum up their general cultivation in a few words. We repeat that the whole family requires liberal treatment, except perhaps Broccoli, in the matter of digging deep and manuring well. The usual way in which the ground is prepared by amateurs is a bad one. The ground is left untouched during winter and autumn, while the remains of the previous crop are left to nourish the vermin peculiar to each different kind. The soil gets solid and impervious to rain, and the winter's rains flood over the surface and wash the essence of the plant's food right away. The smooth surface is not operated on beneficially to any extent by the frost of winter or the drying winds of early spring. But when the crops require putting in, the digging and manuring are commenced—the manure used generally being too fresh to afford much nourishment—and a laborious job the work is; and labour with a will or not, the whole cultivated mass is just a mass of little or large knots, which affords the very worst tilth imaginable for thrusting in fibreless Cabbage plants,—and the loose coherence of these knots causes the soil to assume the conditions of brick-kiln rubbish, and is nearly as ill suited for healthy growth. The ground should be turned over in winter, or even in autumn, and thrown up as roughly as possible to the action of the weather, and a good dressing of manure dug in at the same time. Should the ground be in good condition one dressing will be enough; but in the case of very poor or newly-taken-in land, a dressing of well-decayed manure spread over the surface when it is hard frozen, and forked into the surface-soil in spring when the ground is dry enough to admit of the process, will be repaid with interest. But whether the ground is dressed with manure or not, the forking should take place all the same, breaking every lump. In districts where the rainfall is excessive, or the soil a tenacious clay, this treatment requires some modification. When both conditions have to be contended against, it is best not to dig until February, and that as roughly as possible; and in this case allow the lumps to become quite dry and then moist again before forking them over, when they will crumble down like meal. It is a good plan in all such soils to apply the manure at forking-time in a thoroughly decomposed state. A little rich soil placed at the roots of each is of great service in promoting a start, which is often half the battle.

The best way of planting is by means of a trowel, in drills 3 or 4 inches deep, from 2 to 2½ feet apart, according to the soil and the

plants. Thus for Little Pixie Cabbage or Dwarf Ulm Savoy, 2 ft. by 1 ft. 6 in. is ample on ordinary soil; while on good soil, with strong plants put out early in May, 2½ ft. by 1 ft. 8 in. is not too much for such things as Brussels Sprouts. 2 ft. by 1 ft. 6 in. may be taken as an average width likely to suit the others on ordinary soils, but observation will teach each individual what is most proper in his own case.

As soon as the plants are large enough the soil between the rows should be carefully dug over with a fork, and the plants steadied by having the earth drawn to the stems with a hoe, as is usually done with potatoes. On very light soils in dry seasons, a mulching of rotten manure between the rows will prove of the greatest benefit, by preventing the escape of the natural moisture in the soil. Soakings of sewage or other liquid manure will also prove beneficial.

GARDENER.



MIGNONETTE-CULTURE.

As I have been very successful in growing this favourite plant, a few remarks as to my mode of culture may not be out of place in the pages of 'The Gardener,' to such of your amateur and lady readers as may cultivate this sweet-scented flower. The only variety I have grown this season is Miles' Hybrid Spiral, which is quite an acquisition for pot-culture, the spikes being much larger and the flowers more fragrant than any other variety I have hitherto cultivated in pots. To have a succession of blooms, the seeds should be sown at intervals of a month or six weeks, from April to September. Prepare a few 3-inch pots by cleaning and draining them well: fill them with a compost of light loam, leaf-mould, and sand in a fine state, and sow a few seeds in the centre of each, not all in a heap, but scattered thinly over an inch or two of the surface, and cover lightly with some of the finest of the soil, and place them in a warm pit or house where they can enjoy a temperature ranging from 50° in the night to 60° in the day, after which water with a fine-rosed watering-pan, and cover them with a circular piece of glass, which helps to retain the moisture and keeps up a more equable temperature. As soon as the young plants appear above the soil, tilt the glass at one side by inserting a tally or small piece of wood between the rim of the pot and the glass, and gradually inure the plants to the genial atmosphere of the pit or house. As soon as it can be distinguished which are the strongest plants, remove all the others, and let the strong ones take full possession of the pots. They will soon gain size and

strength, and require a shift into larger pots, using stronger soil, such as good turfy loam, leaf-mould, and thoroughly-decomposed cow-dung, with a dash of sand, and charcoal broken up into small bits, to keep the soil free and open. Pot rather firmly, and shade for a few days until the roots take to the fresh soil, after which they will grow away vigorously, and must be carefully attended to as regards watering and airing, so that they receive no check. The shoots will require to be supported with small neat stakes, and pinched to secure a dwarf branching habit to those which are to be grown as pyramids. We always retain some of the strongest for umbrella-shaped trellises, which are very suitable for standing on the corners of the stages in the greenhouse. This mode of training is easily accomplished by keeping the leading shoot tied to a stake, and rubbing off all lateral growths as they appear from time to time, till it reaches the height of the wire. Then pinch out the point to form the "head of the tree," and tie down the branches to the wire as they grow, bringing them down gently, as they are apt to break off at the heel. As the plants advance in growth they will require another shift into 9 or 10 inch pots, which is large enough to flower them in; and if the flowers are pinched off as they appear for a time, this will generally produce enough breaks to fill the whole trellis. We prefer a few strong branches thinly distributed over the trellis-work to a thick mass of weaker ones, as the vigorous shoots produce larger and better spikes of bloom. Plants having the greatest tendency to branch should be trained as pyramids, and staked and tied out as they advance in growth, till they are required for cutting from or for decorative purposes. In cutting it is well to take the oldest spikes first, as they are apt to form seeds, which greatly reduces the vigour of the plants; and also, to put fresh vigour in them, water occasionally with weak liquid-manure water made from cow-dung and soot, and make it a point never to let them become too dry.

After the earliest-sown plants are well advanced they can be carefully hardened off, and grown in a cool sheltered place out of doors, and taken in again, about the middle or end of September, to a warm pit or greenhouse, where they will flower for a long time, and will repay the care and attention that have been given them throughout the summer. In cold exposed situations, where the weather is very changeable, it is better to keep them in a cool frame all summer, and shade them when the sun is very strong; or place the frame in a shady position, and ply the syringe amongst them in the afternoon in fine dry weather, to keep up a moist growing atmosphere.

DUNDONIAN.

HARDY FRUITS—AUGUST.

THE season has now arrived when special preparation must be made to do what is necessary towards securing fruit for next year. Every tree should be examined, to see that the wood is hard, short jointed, and free from dead portions. If any are in bad health, and others too gross, and not too large to be lifted, mark them with a piece of twine, so that they can be easily recognised in October, when they may be lifted and replanted in healthy loam. Laterals must be stopped on vigorous trees; many of the crossing and unnecessary growths may be cut well back—some taken out altogether, leaving always those which are in the proper positions to aid in formation of handsome trees. Netting of fruits must have attention, especially where fruits are to be kept late. Gooseberries to hang for giving supplies during September and October may be easily saved by the use of hexagon netting; on walls the same may be used to keep wasps off: though they seem scarce hitherto, they may yet come out in great force. Lumps of sugar stuck in the trees may keep them off for a time, as they will eat away at the sugar while it lasts and leave the fruit. In large gardens such a practice would entail a heavy cost for fruit saved by lump-sugar; bottles half filled with beer and treacle or sugar are good traps. Treacle-water and vinegar do well also. Our system with Peaches, Apricots, Nectarines, and Pears is to pull them from the trees when they part from the stalk with little difficulty; they are then laid in boxes or baskets in which is placed soft paper-shavings or wadding; clean paper is laid over, on which the fruit rests, and they are then taken to a dry airy fruit-room, or to a vinery or peach-house at rest. A better succession is thus kept up. The fruit (if not improved in flavour) certainly does not deteriorate; handling by “interested” visitors is avoided, and vermin cannot destroy it. Currants (red and white) keep late when well shaded with hexagon netting, allowing plenty of air to pass through the bushes. Glazed cloth placed above the bushes to throw off rain is serviceable.

Where proper manipulation is carried forward during the growing season, much may be done to reduce labour, relieve workmen from perishing cold during winter, and have much handsomer and better fruit-bearing trees. Apricots should have no shoots tied in except what are really wanted; and they ought to stand well clear of each other. Gross trees may have the roots lifted at one side as soon as the fruit is gathered. Any rank gross roots going straight down ought to be gradually bent outwards; but if they are not pliable, they had better be cut off clean with a knife (not by a spade). Any broken portions of roots should be cut clean off; and when filling in to the roots is being performed, let the rammer be freely used as the soil is returned. A mixture of lime-rubbish, chalk, and smashed bricks is of great service to the trees. Lay the roots flat over this, if possible; but

little twisting and bending ought to be done, as this causes suckers to form and ruin the trees. Lay the fibres in the fresh soil over the hard porous bottom, with the best garden soil over the surface, which may be mulched with rotten manure, or longer and fresher mulching, before winter sets in. The piecemeal system is much safer with trees than lifting entirely during the period when they are at rest. We prefer the system of having all mutilations healed over before fall of leaf, so that they may not suffer during the winter. If Apricots suffer from canker, they should be lifted entirely. When their roots are active among cold wet clay, or soil extra rich, they cannot ripen their wood ; and the consequence is, after they have passed the winter with apparently little harm, they begin to die off piecemeal during spring and summer. The above remarks apply to Peaches, Nectarines, Plums, and Cherries. They may all be pruned on the same principle, by retaining best placed wood of current year's growth, and leaving all natural spurs close to the walls. The preparation of the tree has much more to do with cropping than the weather. Some trees bear well most seasons ; others scarcely ever bear at all, no matter what the season is. Leave the whole of the roots a bunch of fibres in healthy well-drained soil, which will give short hard wood and natural spurs. The roots are the primary matter with every sort of plant, especially those which have to bear fruit. Pears ought to be thin and well ripened in their wood by this time. Those on walls ought to be stopped at several times, to avoid checking them. Where the shoots are strongest, they should be pinched first, going over the whole at intervals of ten or twelve days. Apples, Pears, and Plums, as standards, should be thinned skilfully, but not too severely, so that the buds wanted for next year should be forced to break into growth. Figs ought to be kept stopped and the fruit exposed to sun and air. Trench and manure land for Strawberries ; they do well planted now ; give plenty of room, say at least $2\frac{1}{2}$ feet between the rows. Winter Onions or Lettuce may be grown between them. Trim, clean, and mulch older plantations. Attend to battling against insects, as formerly advised. Orchard-trees, when cleared of their crops, must be thoroughly syringed, to cleanse them from insects, dust, and cobwebs. Keep them cool and airy, and water carefully at their roots.

M. T.

THE FLOWER-GARDEN.

WITH August returns the season for propagating the stock of bedding-plants for next year's requirements, but this season it will be a simple impossibility to obtain cuttings from Geraniums so early without destroying all hope of a display of these for the season ; while those of us who must leave the beds intact until frost cuts the occupants down, have no means of saving the old plants to make up to some extent for the want of young plants from cuttings. There will also be the

quality of the cuttings to be taken into consideration in proceeding with their propagation, for unless the weather changes to a great extent these will be of the most watery nature, and difficult to manage under ordinary treatment. I would advise a particularly light open soil to be used in the boxes—at least a layer on top of such—and the cutting-boxes placed under the protection of lights, and shaded at first from severe sun. A week of such treatment ought to get the cuttings into a safe condition, when, if the weather be fine, shading and lights may be dispensed with, and the cuttings struck in the open. Should wet weather continue and signs of damping at the neck be noticed, the whole batch ought to be placed in a vinery or other structure where they can be safe and are certain to strike. I have been thus particular in advising the above treatment, because a mistake so late in the season must result in a great deficiency in next year's supply. In the case of *Verbenas*, *Iresines*, and plants of a like nature, particularly in the north, it will be advisable to use a little heat, just a very little though, to get them safely rooted. Directly roots are produced, cold treatment must be given them to keep the plants in a dwarf and sturdy condition for passing the dangerous winter months. Those who strike them in July will have less bother than those of us who propagate later. *Lobelias* I find most certain, kept growing in pots through the summer; and as these are very useful for conservatory decoration in the summer and autumn months, and as a large number of cuttings is produced from one plant, a small number of pots is sufficient of these. *Violas*, *Pansies*, *Pentstemons*, and plants of a like nature which are kept over the winter in cold frames, do not require propagating till September. *Carnations* and *Picotees* layered in July should be potted up before many roots are made, and the plants induced to fill the pots with roots before winter sets in. Calling for great attention, from now onwards, is the keeping of beds and lawns in a state of great cleanliness. No ribbon-border looks well unless the different lines are kept perfectly distinct one from the other; but when these are kept well defined, no mode of summer planting is more attractive than this. The lines ought to be picked over about once every ten days; plants like *Perilla* to be regularly pinched in, and *Cerastium tomentosum* and *Königa variegata* to be clipped so as to be level with the grass at the edges. Where *Festuca glauca* and the tall-growing form of *Dactylis glomerata variegata* grow too tall for edgings, it will be necessary to go over the lines of these and pull the tallest of the blades entirely out; both are capital bedders. Lines of *Violas*, and those in beds either by themselves or mixed with other plants, will now require to have all the withered blooms and seed-capsules picked off, when they will flower persist-

ently until the bedding-plants are over. Carpet-bedding will prove pretty much a failure this season. Even in the south up to the middle of July no growth had been made on *Alternantheras* and *Coleus*; on cold bottoms there have many of them dwindled away, requiring to be replaced if a satisfactory display is to be secured. Mostly for want of time, it will be impossible to do this. Growers of *Mentha gibraltarica*, instead of cutting over the plants, will find it do better to pull out pieces entirely, pressing the remainder level. *Pyrethrum*, *Iresine Lindenii*, *Coleus Verschaffeltii*, and plants of a like nature, require to be pinched over at least once every ten days, allowing just the right space for the different lines, &c., and nothing more. Carpet-bedding, in any or all of its forms, owes its success as a system quite as much to high keeping as to beauty of plants or design: where it is impossible to keep the beds in order, no carpeting should be attempted. Autumn-flowering plants, such as Dahlias and Asters, will now be approaching to some state of beauty. Although not generally practised, the Dahlias do best kept thinned slightly out, and all old blooms as they become *passée* taken off. Asters require tying to stakes, and when too thickly planted for full development of the plants, a sufficient number pulled up to give more room. All flowers past their best require immediate removal from the plants. When well grown, Asters are grand autumn-blooming plants. Lines of dwarf *Helichrysums* are very pretty if kept in good condition by keeping all plants of a height. Phloxes, Delphiniums, double *Pyrethrums*, &c., if cut over directly the early bloom is past, as a rule bloom again the same season, though it is doubtful if they will do so this year. *Antirrhinums* raised from seed this past spring will now be getting to a flowering size. These are a beautiful class of plants as improved, as they now are. In order to keep the strain as fine as possible, the worst varieties ought to be destroyed as soon as they are seen to be worthless, and the best only allowed to carry seed. Sowings of these, of the beautiful varieties of *Campanula calycanthema*, of Sweet-Williams, Pansies, and other things requiring autumn sowing, should be made during this month. The ground should be well enriched, but made firm in order to have the young plants stubby and hardy. Flower-gardens in box should have the edgings cut now, but not hard in. Shrubs, if not already looked over, require looking to,—at least cutting back the strongest growths, if close pruning is objected to. It is especially necessary at this season not to neglect grass-cutting amongst beds. No matter how effectively the flowers may be arranged and managed, unless the setting of grass is kept in like condition the entire good effect will be marred. The same remark applies to walk-edgings and the walks themselves. R. P. B.

NOTES FROM THE PAPERS.

ABOUT this period last year we referred to the comments made frequently by the press on the unfavourable character of the season. It was then thought things could hardly be worse; but if 1877 was unusually late and cold, 1879 has, up to this date—the middle of July—proved even more so. A winter of unparalleled length and severity, extending quite through the spring, has been followed by an equally unfavourable summer. In many districts crops are reckoned to be quite six weeks late, or more; and even in the south fears are beginning to be entertained that there will be no harvest. As the Archbishop of Canterbury observed recently, the “inclement weather we have had lately amounts to a national calamity. It is like war or pestilence, or any other devastating agency, and so terrible in its consequences that people are impelled to appeal direct to all merciful Providence for speedy deliverance and succour.” It is stated that the rain one day last week damaged the hay crops to the extent of five hundred thousand pounds. Towards the end of June snow fell in some parts of the midlands; and on the first of July, as the local papers recorded at the time, “a large number of lambs were literally starved to death” on the low-lying lands near Edde, in Derbyshire; and in other districts, on the hills, lambs were *frozen* to death. And records of weather hardly less severe come from many other parts of the kingdom. At one time, before the passing of the Corn Laws, such a season as the present would have produced a famine in the land, especially in depressed times like the present; but as it is, the bad harvest prospects have hardly affected the price of food. Foreign importations have lately been enormous, and best flour does not exceed two shillings per stone. The harvests in Germany are reported to be almost unprecedentedly excellent, and in America the crops are up to the average, and in some instances they exceed it. The “cold wave” seems to embrace an area of which England, France, and Italy occupy the centre, while other countries lying to the right and left of the current have only felt its eddy. A friend of ours lately returned from Rome informs us that the season there was causing the greatest uneasiness; the rains had not been so frequent and heavy since 1819. Another correspondent, writing from Paris on the 4th of July, says, “The weather is just the same here as in England—wet and miserable.” The *habitués* of Rotten Row, in London, are loud in their lamentations. One paper says, “All *fêtes* or enjoyments seem to be put off indefinitely on account of the weather, and we never knew so many people leaving London in search of a better climate. Can there be anything amiss with the great oceanic currents that influence our climate? It has been noticed that in America the Atlantic seaboard has felt the cold most, and that in this country the winds have been unusually cold from whatever quarter they blew.

Is Asparagus spoiled by the process of blanching? This question has been discussed more than once in ‘The Garden,’ where a correspondent has lately answered the same in the negative. The prevailing notion among English gardeners, however, certainly tends the other way: whether they are right or wrong, we offer no opinion. English Asparagus is usually cut about 6 or 7 inches long; of that length two or three inches of the top only is tender and well flavoured in a raw state. The top is brittle, and snaps like a tender French Bean, but the bottom part is tough and stringy, and is usually cut off in cooking. This is undoubtedly a regrettable waste, which, your contemporary says, need not occur if the heads are properly cooked. Asparagus-roots, when forced in this country, either in the beds or

the forcing house, are always covered with about 6 inches of light soil in order to blanch the heads partly, which are cut when they have pushed about two inches or more above the surface, and become slightly green on the top. In cutting, the operator cuts close to the crown, or nearly so, and of course the greater portion of the stem is perfectly blanched and white. In this condition it is sent to the cook, who cooks it as he knows how. This is the practice in private gardens, as described by the most competent authorities on the subject. The thickness of the heads, of course, depends upon the strength and age of the roots, but the produce is always the same in appearance and flavour. Plenty of the fine French Asparagus does not differ from the English-grown samples, except that it is blanched throughout, or nearly so, and is thicker. In a raw state the tops of the French Asparagus are also the most tender portion, while the bottoms are comparatively tough. Now, if these can be cooked so as to be eatable, English Asparagus can certainly be cooked in the same way, allowing for the difference in the thickness of the stalks. The correspondent of the 'Garden' thus describes how French Asparagus is cooked: "The cookery which suffices for common small green Asparagus will not do for these large and fine specimens. They require to be boiled, and are boiled by all cooks who know how to treat Asparagus, standing erect in the water with the tops just out of it, all the stems being cut exactly the same length. The stems are then boiled till tender, and in this process the tops, exposed for about 1 inch of their length, are also cooked tender."

Mr D. T. Fish, within a brief period, has published three voluminous treatises on horticultural subjects, and now "The Peach and Nectarine" by the same author has lately been issued from the press ("The Bazaar Office, Strand"). The volume consists of close upon three hundred pages of small type. The culture of the Peach is a subject which can be, and which has always been, treated at considerable less length than the Pine or the Vine, for the simple reason that there is not so much to be said about it; but Mr Fish does not seem to be of this opinion, and he has produced a book on the Peach and Nectarine which contains, we should say, at least twelve times as much matter as Thomson's book on the Pine-Apple—about six times as lengthy as that work and W. Thomson's 'Culture of the Vine' put together. If to these two books you were to add all that has been said on the Peach in Robinson's 'Parks and Gardens of Paris' and 'Thomson's Gardener's Assistant,' you would have about an equal quantity of matter to that produced by Mr Fish on the Peach alone. Mr Fish's list of vermin and diseases that afflict the Peach amount to the moderate number of thirty-five, and they are disposed of in a matter of fifteen columns. This list includes dogs, fowls, birds, rats, mice, butterflies, snails, slugs, squirrels, hornets, jaundice, and gout. The two first are certainly an addition to the list, and we have doubts about some of the others. As for "dogs," we are sure it suggests rabies. A vitiated appetite is one of the first and surest signs of hydrophobia; and when a dog forgets its carnivorous instincts, and consumes indiscriminately "Peaches, Nectarines, Apricots, Plums, Grapes, Pears, and Gooseberries," it wants to be taken care of, without doubt. Mr Fish has known "at least four pet dogs that ate fruit greedily;" and his "present house mongrel" appears to have an exceptionally depraved appetite in this respect, for it devours all the above fruits, and is a thief as well. For these reasons dogs have been included in the list of enemies of the Peach. From this imperfect notice we hope the reader will be able to form some idea of Mr Fish's labours—for the rest we must refer him to the book itself. If he can find time to peruse its contents, he will find, of course, much good

advice regarding the culture of Peaches and Nectarines out-doors or under glass.

It was asserted some time ago that the introduction of St Michael's Pine-Apples would not affect the sale of home-grown fruit except during the winter and spring months. This hope, however, seems likely to be dispelled. Mr A. Garcia, of Covent Garden, writing to the 'Gardeners' Chronicle' in July, says, "I have just received from the Island of Madeira a consignment of fifty Pines, which are larger and much superior in quality to any that we have received from St Michael's. They average in weight from 6 lb. to 9 lb., and rank amongst the finest examples that we have had in this market. They have come in very conveniently, too, just after the St Michael's are done." If their fruit are superior to the general run of St Michael's, which are, many of them, quite equal in size and quality to the best English-grown samples, they must be very superior indeed. Madeira being considerably nearer our shores, it may, however, be expected that the Pines will be imported from there in a riper state than those from the Azores; and it is probably in this respect that they are superior.

A correspondent (a learned one) of a contemporary has made a rather extraordinary discovery relating to the Apricot disease. The branches, he tells us, die through "a temporary paralysis of proper action between root and branch." No doubt! When death occurs in any aspect there is generally something amiss with the "proper action." The juryman who ventured the opinion that the deceased "died for want of breath," was equally shrewd in his surmise. It is also observable that the branches are killed through a *temporary* fit of paralysis, which is another extraordinary circumstance. Doctors of human patients distinguish between "fatal" and "temporary" attacks, but according to this discursive correspondent of your contemporary, Apricots *die* of a disease that is not *fatal*. Understandest thou what thou writest? is a question which might be often and with advantage put to some writers.

Mr Wills is "neither to haud nor to bin'." The Committee of the Royal Horticultural Society had decided that it was inexpedient to hold an International Exhibition in 1880, owing to the depressed state of trade and other reasons; but Mr Wills decided otherwise, and tried to drive the Committee into his way of thinking and acting also. In this, as might have been foreseen, he failed, and he is wrathful, while the public laugh provokingly. Mr Wills had a motive for getting up a great international exhibition in which himself, His Royal Highness the Prince of Wales, the Lord Mayor, and a number of other dignitaries might probably have shone as principal luminaries, and his motive was patriotism—a burning devotion to his country and to horticulture. Seriously, people do not as a rule believe in patriotism that expends itself in fits and bursts, more especially when a distinct element of self-interest appears to be involved, or which quarrels and sulks when it is thwarted. In horticulture, as an industry worthy of fostering in its lowest and highest spheres, there are plenty of opportunities for enthusiasts who are anxious to do something in its behalf besides fitting up a great exhibition, the influence of which would at the best be doubtful except in so far as it be a means for tradesmen to advertise their goods.

READER.



CUCUMBER SIR GARNET WOLSELEY.

MR JAMES HAMILTON of Carlisle has long been celebrated for Cucumber growing, but more particularly for carefully hybridising and raising fine varieties. He is this year growing very extensively a variety which is the result of a cross from Deans' Prolific fertilised with the Duke of Connaught. It is the most handsome Cucumber we have ever seen, and is of excellent flavour. It grows to an average length of 18 inches, is entirely destitute of shank or shoulder, is smooth and even in its growth. As a rule, it produces three fruits to every joint, which swell rapidly to maturity in succession. Taken as a whole, we consider this the best Cucumber we have ever met with, and predict that it must become a great favourite of Cucumber growers.

**HEATING BY HOT WATER.**

IN reference to "C. M.'s" last paper on the above subject, I have to remark in the first place that if it had not been for the two last sentences in it, I would not have taken any notice of the others. The sentences referred to imply that his object in continuing the discussion is to elicit truth. Now, when writing the paper that has led to the present discussion on heating by hot water, my object was to put before the readers of 'The Gardener,' in as plain and short a manner as I possibly could, what I knew to be the truth on the subject with which I was dealing. "C. M.," however, thought right to dispute my conclusions, and not in a style that would lead one to suppose his object was to bring out the truth of the matter, but in a way calculated to induce those who have not given much thought to this particular subject to suppose that my statements were wrong, and that he knew them to be so.

When reading "C. M.'s" paper in the April issue of 'The Gardener,' in opposition to mine in that of February, it struck me that he had not given the subject with which he was dealing much thought, and his last paper strengthens that belief. If "C. M." had got any great length in his studies on heating by hot water, he would know, and therefore believe, that opposing currents of hotter and colder water take place, without equalising, in the flow-pipes when they are laid on a continuous rise from the top of the boiler to their furthest points of extension in the compartments to be heated. I note that in his last paper he says, "mixing and equalising to a certain extent at the commencement of circulation;" and this qualification of his ideas on this particular point, as put forth in his first paper, is an evidence that he is making progress in the right direction; and I have no doubt in due time he will get on the "right tack," and throw the equalised, mixed,

forcing theory of circulation overboard altogether. I also observe that he maintains that hot ice "is not at all" a curiosity; but in his endeavour to prove this, he is obliged to depart from the generally accepted meaning of the word "hot," and when he is forced to do so in order to support his argument, it is pretty clear the latter is of an unsound nature. That "ice is not always of the same temperature" is a well-known fact; but, notwithstanding this truth, ice has no sensible heat, and the latter is the right definition of hot, and therefore *hot ice* would be a curiosity, whatever "C. M." may think or say to the contrary. That "ice is only a transformation of a body" is also true; but "C. M." is slightly mistaken when he says, "if that body is converted into its normal condition, water, it expands by the application of heat, like all other bodies." All other bodies, whatever may be their actual temperature, expand if that temperature is raised, and contract if it is lowered. On the other hand, water must reach a temperature of $39\frac{1}{2}^{\circ}$ before expansion commences, so that, until reaching that temperature, water, like its transformation, ice, is an exception to "C. M.'s" rule that "all bodies expand by heat." That "a certain amount of heat becomes latent when ice is converted into water" is also true; but this fact does not assist "C. M." in proving that one particle of water is capable of transmitting heat to an adjoining particle by *conduction*; neither does it prove that "ice becomes hot when it is being converted into water;" and, moreover, the latent heat of water is of no use for heating our plant-houses, or anything else. The following experiment will show the amount of sensible heat that becomes latent when ice is converted into water. Take a pound of ice and pound it fine; put it into a wooden vessel of suitable dimensions; pour on to it a pound of water at a temperature of 172° . The result will be two pounds of water—not at a mean temperature between the ice and the hot water, but at a temperature of 32° , thus showing that the ice did not become *hot* in the process of being converted into water. The ice absorbs the sensible heat, and it disappears somewhere and is lost.

"C. M." tries to make it appear that I admit that water transmits its heat to *water*, and all other bodies, in the same degree. What I said on this point was as follows: It is true water parts with heat to all *other* substances with which it comes in contact that are of a lower temperature than itself, but the degree of rapidity with which it does so is measured by the conducting power of the material acted on. If "C. M." construes this into an admission on my part that *his facts* are "chiels that winna ding," he is at liberty to do so—at least, so far as I am concerned. I would here, however, point out to "C. M." that misquoting his opponents is not the most likely way of convincing them that they are wrong. "C. M." "fails to see the difference between" the first promoters and the cause of circulation, as the latter takes place in the hot-water apparatus. Perhaps I will fail in making the difference plain to him. I will try, however. Heat and expansion

cause the water to become relatively lighter than it was before heat was applied and expansion took place. Cold and contraction cause the water to become relatively heavier than it was before cooling and contracting took place. Now it requires both agents—heat and cold—to maintain circulation; neither can do so independent of the other. It requires both to bring about the immediate cause—not the primary reason—of the water circulating through the apparatus. In the case of the hot-water apparatus, we make heat and expansion the *first* promoters of circulation, because we want to *heat* our plant-houses; but on a hot summer day, if we wanted to *cool* them, we would make cold, or rather the absence of heat and contraction, the *first* promoters of circulation, and in place of using fuel under the lowest point of the apparatus, we would use ice of as extreme cold as we could get. By the by, may I ask “C. M.” how many degrees below zero does he fix “extreme cold, as the absence of heat?” On the top of the highest point circulation would take place just the same as if combustion was going on below the boiler, which shows that heat and expansion have no more to do with circulation than cold and contraction. I need scarcely point out that “C. M.” is mistaken in supposing that expansion “moves in one direction only—that is, towards the highest point of elevation.” If the force of expansion was towards the highest point *only*, it would not be necessary to have the bottom of a steam-boiler as strong as its top. Expansion, however, is from the centre, and acts with equal force in *all directions*, therefore all parts of a steam-boiler are made, or ought to be, equally strong.

“C. M.” says the relatively heavier water in the flow “must either be forced or drawn uphill;” and, “to prove that it is not drawn,” he points out that “there are generally air-pipes at the highest point of elevation, and before the heavy column in the return would draw up the column in the flow, the air would rush in and fill up its place.” This may furnish a reason for the incorrectness of the opinion that circulation is principally due to the relatively heavier column; but I think those who hold this opinion will not consider the reason conclusive that they are wrong; and if “C. M.” has no other but this air-pipe proof to offer in support of his statement that the relatively heavier water in the flow-pipes “must be forced uphill” by the relatively lighter water, then I submit he has failed in his effort to prove what he undertook to prove. How could air rush into an endless tube full of water, and the feed-cistern higher than the highest point of the apparatus? In a properly-fitted-up hot-water apparatus, neither column pushes, pulls, forces, or draws the other: both columns move contemporaneously; and when either column has to push, pull, force, or draw the other, there is a defect in the fitting-up of the apparatus at some point.

We now come to where “C. M.” uses the word “absurdity.” It is not quite clear to me whether he intends absurdity to apply to his statement or to the inference I drew therefrom. If to the former, I

apologise to him for alluding to it; if to the latter, then I ask him what other inference is it possible to draw from the statement referred to, but that the water suffers no diminution of temperature on the way from the boiler to the highest and farthest point of the structure. Next, "C. M." tells us, "it is a well-known fact that a house situated above the level of the others is the hottest, which proves the value of elevation." I must again differ with "C. M." It does not prove the value of elevation; neither does it prove that a quicker circulation takes place in the higher house. It only proves that the hotter water gets there, probably through the apparatus being fitted up on the equalised, mixed, forcing, or on the strata theory of circulation, by some one who advocates sinking the boiler as far as practicable below the main body of the piping, and whose knowledge of heating by hot water extends only a little beyond the fact "that water is water, a liquid, and not iron, stone, lead, or ice." I must also say that it is *not* "a well-known fact that a house situated above the level of the others is the hottest." If "C. M." will do me the honour of a visit, I will show him that this fact of his is not amongst those "chiefs that winna ding."

The points of practical value to be settled in this discussion are, in my opinion, as follows: Is a continuous rise in the flows, from the top of the boiler to their farthest points of extension in the compartments to be heated, essential to rapid circulation? I say No; and in place of being essential, the continuous rise is a hindrance to circulation. Is it necessary or essential to rapid circulation that the top of the boiler should be below the main body of both the flow and return pipes, whether there is only one house to heat or a range of houses? I again say No, and that any number of compartments in a range can be successfully heated without sinking the bottom of the boiler more than one foot below the level of the lowest floor on which it is necessary to place the pipes in any of the divisions composing the range; and further, that this can be done without a dip (that is, dipping and rising again) in the flow. Now if those who differ with me will keep to the points here indicated, it will save valuable space in 'The Gardener' at present; and when the long nights come, perhaps the Editor will find room for us to discuss the side-issues of this watery question.

J. HAMMOND.

BRAYTON HALL, *July 11, 1879.*

I WAS sure Mr Hammond would be surprised to hear that hot-water engineers and gardeners were perfectly familiar with the system of laying pipes with a continuous direct fall from the top of the boiler down to the return. He is so surprised, that he can even yet hardly credit the astounding intelligence. This being a matter of fact about which it is unnecessary to have any discussion, I have simply to inform Mr Hammond, that if he chooses to come to Edinburgh, I will show him places fitted up twelve and twenty years ago in the manner referred to; and, moreover, my own firm have during the last ten years fitted up a

considerable number of places with the pipes running down all the way from the boiler; and I know other hot-water engineers who have done the same. This will surely settle this point, whatever we may make of the others.

Mr Hammond complains that I pass by his remarks by characterising them as serious and grievous errors, &c., because I cannot refute them; *but I have refuted them*. His statement about it making no difference to the circulation whether the boiler is 2 or 4 feet below the level of the pipes I characterised as a grievous mistake, and I proved this conclusively by quoting one of the first authorities upon the subject. I was in doubt what Mr Hammond really meant in his original article on this point, and therefore I queried thus: "If by this he means that it makes no difference to the circulation whether it is 2 or 4 feet from the lowest point to the highest," &c. Now, most unfortunately for Mr Hammond, he settled this point in his reply to Mr Inglis in the May number by boldly staking his whole case upon two points. He says if he is wrong here he is wrong altogether, and all that he has said is worthless.

I shall prove that on these two points—viz., the return current and vertical height—he is in error, and consequently all he has said *is* worthless. In that reply he says, "the rapidity of circulation of the water in the heating apparatus *is not measured or determined by the elevation of the flow above the point on which the fire acts*, but by the difference of the specific gravity of the volume of water in different points of the apparatus." I quoted Mr Kinnear Clarke to show the utter fallacy of this idea. I quoted his very words; but it is clear that Mr Hammond does not understand the figures, otherwise he would never have written as he has done in his last. He says Mr Clarke qualifies his conclusions; but I say he does not—not in the slightest degree; and, moreover, Mr Clarke could not possibly qualify this law—he has merely formulated what is admitted by all scientific men since the days of Torricelliana Pascal. Let it be observed that the point here is *not the rate* the water moves at, which is determined by local circumstances; but whether by increasing the vertical height *the motive power is increased also*; for if only a half or a ninth of the absolute power due to gravity is available when the height is 20 feet, only the half or a ninth is available—other things being equal—at 10 feet. Therefore, whatever the velocity may be in an apparatus at 10 feet of height, this is increased by the difference between 96.6 and 136.2; or, in other words, by increasing the height from 10 to 20 feet, the motive power, whatever it is, is increased nearly 42 per cent. Mr Hammond, after proving conclusively—to his own satisfaction at least—that the vertical height has nothing to do with the motive power, says the way to increase the velocity is by increasing the difference between the temperature of the water as it leaves the boiler at the highest point and enters at the lowest. This is exactly equivalent to saying, that although he is certain 2 and 2 does *not* make 4, he is quite sure 1 and 3 does. I will show that increasing the *vertical height* and increasing the *difference* between the temperatures of the two columns acts exactly in the same manner, and exactly in conformity with Mr Clarke's figures.

But if, as Mr Hammond says, the proper way to increase the velocity of the circulation is "by causing the water to flow over a larger surface of piping in the houses to be heated," then the more piping on an apparatus the quicker the circulation; and if, in an apparatus of say 3000 feet, it takes an hour and a half from the time the fire is lighted until all the water in the apparatus has passed through the boiler, by increasing the quantity to 6000 feet, will the water make the circuit in less time—say an hour and a quarter? If increasing the quantity of piping determines the rate of speed at which the water moves, then it would

be possible to put on piping—say 10 or 100 miles—sufficient to drive the water through the apparatus at a speed equalled only by the electric spark. I have no doubt they will. I may here state that, as any one may see who takes the trouble to read my former letter, when I referred to Mr Hammond not mastering the subject, I referred not to the *whole* subject of heating with hot water, as Mr Hammond tries to make it appear, but to that particular branch of it which deals with the *motive power*. I will now show that increasing the difference of the temperature between the water as it leaves the boiler and in the returning column acts exactly in the same manner as increasing the heights.

I will again quote Mr Clarke ; page 484, he says : “Motive power of water in circulation through heating pipes. The ascensional force is measured by the difference in weight of the two columns of water of the same height ascending and descending to and from the boiler. The difference of weight is ascertained from the difference of the average temperature of the columns from which the respective densities are deducted by the aid of table No. 109, page 339.” He then goes on to give the formula which I quoted. Mr Hood in his work, page 18, says : “The higher we make the ascending and descending pipes, the more rapid is the circulation of the water ;” “because, as motion is obtained in consequence of the difference in weight of the ascending and descending columns of water” (and this difference in weight is owing to different densities ; or, as Mr Hammond says, the difference of their specific gravities), “the greater the height of these columns the greater must be the difference in their weight, and therefore must be the force and velocity of motion.” Again, on page 28, Mr Hood says : “There are two ways by which the amount of the motive power may be increased,—one, by allowing the water to cool a greater number of degrees between the time of its leaving the boiler and the period of its return through the descending pipe ;” “the other, by increasing the vertical height of the ascending and descending column.” “*The effect produced by these are precisely similar*, for by doubling the difference of temperature between the flow and return the same increase in power is obtained as by doubling the vertical height.” Mr Thomlinson, in his ‘Treatise on Warming and Ventilating,’ adopts and endorses Mr Hood’s calculations, pages 133 to 138. Mr Deuchar’s ‘Garden Architect: Treatise on the Construction of Hothouses,’ page 187, says : “When the motive power, therefore, is not of sufficient strength, the increase of the height of the column ascending from the boiler must be depended on for any additional motive power.” Mr Hammond says that the proper way is to increase the quantity of piping in order that the water may be colder when it returns to the boiler. No doubt this is one way, but a most *improper* way, for two considerations : first, the quantity of piping must be settled by consideration apart from the circulation ; and second, because by *increasing the quantity the friction increases in a greater proportion than the power*, and consequently increasing the amount of pipe past a certain point will prevent circulation altogether. I am sure I need no elaborate argument to prove this to the intelligent readers of ‘The Gardener.’

Now, as to the alleged return current in flow-pipe. Mr Hammond has no misgivings upon this point. He asserts that a return current goes on continually in the flow-pipe, and to stem this current all the efforts of his genius are directed. His manner of proving the existence of this current is curious : it is, that water of less specific gravity cannot force that of a greater uphill. If a lighter fluid cannot force a heavier uphill, there never can be a forward motion at all in hot-water pipes with a rise to far end from boiler, nor can there ever be any circulation in any apparatus, even on his own principle ; for, suppose there is 4 feet of a vertical pipe before the continuous descent begins, how can the lighter and

hotter water get up this pipe except it force the colder and heavier water before it, for the water at the very top of the boiler must be hotter and lighter than at a point 4 feet away? That a lighter fluid, bulk for bulk, can force a heavier uphill, every mercurial barometer, every pump and chimney in the country proves. All circumstances connected with the case show conclusively that this back current can only exist for a few minutes after the fire is kindled, and is, as Mr Hammond says, not worth talking about.

To satisfy those of your readers who have taken the trouble to follow this discussion, and whose tastes and habits of thought have not led them to investigate the matter, I may state that in a heating-apparatus I have fitted up for the very purpose of experiments, there is inserted in the flow-pipe, about 4 feet from the boiler, four glass slips 6 inches long, $1\frac{1}{2}$ inch broad, one on top, one on bottom, and one on each side. By watching the flow of the water, it can be seen, without the shadow of a doubt, that four minutes after the fire is put on, forward motion begins at this glass, and two minutes after it begins *the whole body* of the water from top to bottom, from side to side, goes forward up the hill from the boiler, and not a vestige of a return current. It is impossible, from the nature of the case, it could be otherwise. This apparatus, I may say, contains about 150 feet of 4-inch pipe, and is erected in such a way that it can be made to have a rise to far end 60 feet away from boiler; or with a continuous run down from top of boiler to return. I may also state, that from elaborate experiments carried out by inserting a series of thermometers in the pipe, and noting the rise on the register, I find that, with a rise to far end, and $1\frac{1}{2}$ foot more height, the water goes round several minutes quicker than with a continuous fall, as Mr Hammond recommends. This is again exactly what one would expect—viz., that the circulation should be slower with the less height. It makes no difference where the highest point is—not a shade of difference. I may say further, that these trials have been repeated over and over again with the same result; and should any reader of 'The Gardener' have any doubts remaining, I shall be delighted to place the apparatus at his disposal, and let him satisfy himself. I can send you figures and full particulars should any one desire to see them.

Now as to the stoke-hole, which is really the important point in this discussion, I have a difficulty in understanding Mr Hammond's position. What does he propose? I find in my experience, which has been considerable—having been, speaking roughly, connected with the erection of about six or seven hundred ranges of glass, large and small—the great difficulty to be, having to pass doorways and passages, and in ninety-nine out of every hundred cases where we have a deep stoke-hole this is the cause. I am sure every one concerned will be delighted to find some means of avoiding this unmitigated nuisance. Well, what does Mr Hammond advise? My firm have several ranges of glass to heat just now with a passage running from end to end of the range about 2 feet from the back wall; the boiler is to be placed on the north side of the passage, and as the passage has to be crossed at least in three different places, we are at present in the belief that we must sink the boiler until the flow-pipe is at least a few inches below the floor level. We are afraid of water, and may have to cut a drain, at considerable expense, to avoid being drowned out.

Now if Mr Hammond can make the apparatus work as well with the bottom of the boiler one foot below the floor level, we shall not only be delighted to have the information, but pay him handsomely for it; or, if he takes out a patent, I will guarantee that he will soon make a large fortune. I confess I am quite at a loss, after reading his three letters, what it is he proposes in this direction.

He commenced his original article in the February number by reprobating

“the practice of sinking the boiler below the level of both the flow and return pipes.” For my own part, I began and ended my former letter by a reference to what I consider a necessary evil—viz., a deep stoke-hole. But no one is yet any the wiser for all the information Mr Hammond has vouchsafed us.

I ask Mr Hammond, as a special favour, to go into the matter in reference to arrangements of houses as above, which, I assure him, from a pretty extensive knowledge of hothouses, is the main difficulty. I am perfectly well aware that various ingenious expedients have been recommended to overcome dips by throwing all the hot water up into a box and other means; but all who are conversant with the matter know that the success, where adopted, has not been by any means of such a nature as to lead others to follow; and if Mr H. has nothing better to recommend, he is again only bringing forward the ghost of bygone days.

If Mr Hammond's sole object is to prove that after the pipes travel, say 50 or 60 feet below the pathway with a gradual rise, they should—or rather the flow-pipe should—immediately on entering the house, rise to its highest point, then gradually slope back to the return, is the best way to lay pipes, I do not know if there is really much necessity for discussion about it. For my own part, I consider it of not the slightest importance, any further than may be desirable from accidental circumstances. If the height is the same, there is no difference between the power necessary to raise the water in a vertical pipe than in a pipe at an angle, whatever that angle may be, from the well-known law of liquids that pressure is to be counted by *height only*; for “the pressure exerted by a liquid in virtue of its weight (or gravity) on any portion of the liquid, or on the sides of the vessel in which it is contained, depends on the *depth* and *density* of the liquid, but is independent of the *shape* of the vessel and of the *quantity* of the liquid” —Ganot's Physics, p. 79,—italics are mine. This proves that the expenditure of power is the same in raising water by pressure in a vertical direction as at an angle. It also further proves what I proved already, that the pressure depends on the depth or height and the density of the liquid, so that it makes no difference to the motive power, seeing the friction in both cases must be the same.

If he objects to Ganot, let him consult any authority he pleases. Chambers, in ‘Hydrostatico-Pneumatico,’ p. 4, says: “When a pressure is exerted on any part of the surface of a liquid, that pressure is transmitted undiminished to all parts of the mass and in all directions;” and on p. 7: “the pressure of water increases in intensity with the depth without regard to the shape or size of the cavity or vessel containing it;” and again, p. 8: “the pressure on the horizontal bottom of a vessel is as the area of the bottom and the perpendicular height of the liquid, &c., that without regard to the shape of the vessel.” It is surely unnecessary to bring forward further proof. Any one who wishes to pursue the subject further should consult the authorities named, or others—Tyndall, Lardner, Todmorton, Dr Golding Bird,—they all agree upon this. Having shown that the motive power in a hot-water apparatus depends directly upon the vertical height, and that it makes no difference to this motive power whether the highest point is near the boiler or at the farthest end, I have only to state, further, that the discussion on the point raised by Mr Hammond is not of yesterday. I find that Mr Hood, in his ‘Treatise,’ p. 12, thus refers to it: “Some persons have imagined that if the pipes be inclined so as to allow a gradual fall of the water in its return to the boiler, additional power is gained. This at first appears very plausible, particularly with regard to some forms of the apparatus.” He then proceeds, by a series of elaborate calculations, to prove this idea to be an error; so that the ghost was laid forty years ago, and the apparition Mr Hammond has

conjured up is only a bogus ghost at the best, which I am sure will not trouble us much.

It only further remains for me to notice Mr Hammond's extraordinary experiment to prove that practically water is an absolute non-conductor. In any case, whatever it proves, *it does not prove* that water is practically a non-conductor. I think, if I recollect right, I have seen something about such an experiment to illustrate the doctrine of what is called the latent heat of liquefaction and the specific heat of water. Had Mr Hammond informed himself properly he would have known that the reason why his hand in his experiment will not feel any sensation of heat until the whole of the ice is melted, is not because it is an absolute non-conductor, but because of the great amount of latent heat taken up in the passage of water from the solid to the liquid state; for it is found that it takes as much heat to melt *one pound* of ice at 0° as to raise one pound of water from 0° to 79.24° ; therefore the latent heat of fusion of water is fixed at 79.24° centigrade, or 142.65° Fahr. — (See Deschand's Natural Philosophy, translated by Professor Everett, part ii., pp. 426-444.) In other words, one pound of ice at 32° Fahr. requires as much heat to melt it, without raising the temperature one iota, as will suffice to raise one pound of water from 32° to 142.65° Fahr. But the conducting power of water need not be a disputed power at all: it has been fixed just as definitely as the conducting power of solids; and although a very feeble conductor compared to most of the metals, such as gold, silver, copper, &c., makes a favourable comparison with the earths.

As I said before, liquids are bad conductors, but water is one of the best. From experiments made by Despretz, he fixed the conducting powers of various substances as follows: Gold, 1000; silver, 981; copper, 897; zinc, 363; lead, 179; porcelain, 12; iron, 374; tin, 304; marble, 23; brick-earth, 11. He fixes the conducting power of water at $\frac{1}{95}$, that of copper-ore 9.44, while copper is 8.97; therefore any one will see that although it is not a good conductor compared to some solids, it is about as good as some others,—which shows that Mr H.'s rough-and-ready way of deciding the point is worth nothing; but if he *will* take a rough-and-ready method, let him go to a Turkish bath at a temperature of 160° ; he will find he can bear it easily, if not comfortably,—he can handle wood, cloth, &c., without inconvenience. But let him put his hand into water at 160° , and I rather think he will come to the conclusion that it is not a non-conductor, for it will part with its heat into his hand in a manner more sudden than agreeable. Or, on a frosty morning, with the temperature at zero, let him handle wood, stone, cloth, and ice in the open air, when they must, of course, be all at the same temperature. He will find that the ice will conduct the heat from his hand sufficiently quick to make it very unpleasant, and very much quicker than wood, cloth, and many other substances. In fact, as I said already, it is exceedingly inconvenient in discussing any question to have to prove every fundamental point which ought to be known to every schoolboy. In conclusion, I have only to state that, if the explanations already given do not convince Mr Hammond that he is wrong fundamentally on almost every point, I despair of making it plainer.

A. D. MAKENZIE.

2 GROVE TERRACE, EDINBURGH.

I have already encroached too much on your valuable space in reply to Mr Hammond, that I cannot ask you to find room but for a few words in reply to J. S. W., who asks my opinion about the failure of the miniature hot-water apparatus described by him. While not professing to dogmatise in such matters, I am of opinion that the cause of the failure was the enormous amount of

friction in such a length of small pipe. It is rather an intricate subject; but I may mention that, roughly speaking, the friction on water flowing through a half-inch pipe is relatively eight times as much as through a 4-inch pipe,—so much so that, in a very long, small pipe, friction sometimes, as in J. S. W.'s case, stops the flow altogether. When water has to circulate through a very long pipe in heating, it is necessary to use steam or other power to force the water, and various ingenious engines have been from time to time adopted for this purpose. If J. S. W. is satisfied that his "boiler of the future" is *the* boiler of the future, the failure of the gas-pipe need not discourage him. Friction is apt to be forgotten, but it is a most important element, and should not be lost sight of. Where it is not considered, the theory as well as the practice is defective.—
Your obedient servant,

A. D. MAKENZIE.

July 11, 1879.

WHEN the discussion on this subject was first opened by Mr Hammond, I understood that his object was to show that, in ordinary cases, deep stoke-holes, and giving the "flows a continuous ascent from the top of the boiler to their farthest point of extension in the building or buildings to be heated," were unnecessary. Since various theories have been advanced as to the cause of the water circulating, it now seems to me more of a theoretical quibble than a comparison of attested facts.

In the July number, R. Inglis alludes to an "old fitter," who boasts of one pipe acting as a flow and return. In that case there would be two currents of water, travelling in opposite directions, the upper stratum going from, and the under returning to, the boiler. This is what will occur in the flow when a continuous ascent is given them, not only at the time of "setting the fire agoing," but also while radiation of heat from the pipes continues. This I have proved by inserting a glass cylinder about 2 feet long, the same size as the flow-pipe, so that it forms a part of the same; and after mixing with the water particles of matter of about the same specific gravity as the water, the two opposite currents were plainly visible.

R. Inglis "predicts" that a greater quantity of water would flow if the pipes were to ascend instead of descending on leaving the boiler. One of the houses I alluded to in the May number has equal to 350 feet of 4-inch pipe, and the flow runs down an incline of about 14 inches to where it enters the house; then it continues its course on a level, and on leaving drops about 13 inches, followed by a slight descent to the boiler, near which is one of Messenger's valves.

The action of this apparatus I will endeavour to describe. Thus, supposing the whole to be cold, and the valve closed: the fire is set agoing, and the water in the boiler is raised to 200° Fahr. If you then examine the boiler, which is uncased for the purpose, you will find that to the touch there is scarcely a perceptible difference in temperature between the bottom and top. The return-pipe, so far as the valve, will be hot. That part of the flow on a level with the aperture where the water leaves the boiler will be hot also, but the part which is below that level cold, as at the commencement. Open the valve. What is the result? The hot water speedily passes down the flow, and the bottom part of the boiler becomes cold by the inward rush of cold water, and continues cold, however fierce the fire may be, until the whole of the cold water in the pipes has made its circuit and become heated.

R. Inglis thinks J. H. "will no doubt be done for ever with the old system."

J. H. has tried the old system, and also what we may call the new system, and given each a fair trial. Has Mr Inglis done as much?

What I use for a boiler is six of Cannel's flues. The space for the fire is rather large, and surrounded by fire-brick. This may appear wasteful; but on trial it was found to evaporate 6.8 lb. water per lb. of coke consumed. Not very bad, compared with steam-boilers. I name this, as some may be disposed to doubt what I stated above—viz., that there is to the touch scarcely a perceptible difference of temperature between the bottom and top of boiler when heated to 200° Fahr., and disconnected from the houses by closing the valves.

J. HISCOCKS.

THE MILLS, SWALLOWCLIFE, SALISBURY.

[We think the points at issue are very important, or we would not have devoted so much space to their discussion; and we hope that all irrelevant matter will be as much as possible avoided by our correspondents. A few facts as to the practical working of the different systems are worth volumes of speculative argument.—ED.]



ROUND LONDON.

A FRIEND who went up to London with me to "do" the show at Kilburn, declared, after a day's wading amongst the acres of mud, that the mud of itself was worth going four hundred miles to see. For myself, after looking at the collections of manures from various firms, the collections of seeds, which were extremely interesting, and the horticultural buildings and other appliances, I thought I had had about enough of it, and left the glories of Kilburn for more congenial fields. The wretched weather of the present year has made it one of the very worst for inspecting gardens, for, despite the utmost care and energy of the gardener, the continued rain and cold have defeated even his most determined efforts. Kitchen-gardens as a rule were very weedy, crops backward and poor in quality; flower-gardens obviously failures, more especially so where many of the more tender subjects, as *Coleus* and *Alternanthera*, are used. In many instances these latter were either entirely stripped of their leaves, or at the very least badly damaged, the *Coleus* in some cases dying off entirely. Sub-tropical plants were peculiarly wretched looking, tattered with winds and spotted by hail. In many kitchen-gardens the Potato crop will never be worth lifting: where the plants are strong, disease had commenced its work on the shaws. Turning to fruits, bush and soft fruits are plentiful, but the Strawberries must rot unless a decided change to warm sunny weather supervenes directly. Plums are a failure, Apples and Pears the same, except in the case of the never-failing sorts which it is folly to ignore so much. Amongst indoor crops, mildew is somewhat common on Strawberries, Peaches, and Grape-Vines, a damp stagnant atmosphere being wonderfully productive of that pest in a season like this. In passing through some score or more of gardens, I was forcibly impressed with the healthy, robust, and clean appearance of the stove-plants in those gardens, where a cooler temperature was the rule, as against those where a hot steaming atmosphere obtained. It might have been that in the one case the plants could be inspected with enjoyment, whilst in the other a few minutes' steaming was certain to produce a headache, and a consequent hurried run through the houses, leaving thereby quite a different impression from the leisurely inspection in the former. Leaving out any reference to the London Parks, notes are made of some of the more interesting gardens visited. One of the first of these inspected was

that of Sir Trevor Lawrence, M.P., at Burford Lodge, Dorking, which is becoming famous for the grand collection of Orchids in course of being formed there. The collection is so large and varied that there is only space to note a few of the more rare or large specimens. In the cool-house were numbers of *Odontoglossums* of various kinds, all in the finest health, including *O. vexillarium* flowering freely. Mr Spyers, the Orchid-grower, thinks the flowers of this species are deeper in colour when grown in a higher temperature than that of the cool-house. The extremely pretty *Masdevallia bella* was flowering profusely. A fine specimen of the rare *Restrepia antennifera* had several flowers developed. *Oncidium incurva* was noted as good for producing flowers for cutting purposes; and several plants of *Epidendrum vitellinum*, with their glowing spikes of scarlet, lent colour to the whole. In the next house were noted *Epidendrum Wallasii*, rare and curious in its colouring; a grand plant of *Calanthe Dominiana*, extraordinary in its shade of colour; the deliciously scented *Ærides japonicum*, fine plants of *Bollea cœlestis*, the new *B. Lawrenceana* just opening, the nearly allied *Pexatorea Klabochorum*, a large mass of *Cœlogyne barbata* growing and rooting quite freely, and grand plants of *Cymbidiums eburneum* and *Mastersii* growing in loam. In the *Cattleya* house were flowering *Dendrobium sulcatum*, curious in its shade of yellow; *Cattleya Mossiæ* in numbers, *C. maxima*, *C. amethystoglossa*, and specimens of *Lælia purpurata*. Many of the species were represented by splendid masses, including a very large piece of *C. gigas*. In a large stove we noted the curiously bearded *Bolbophyllum barbiguum*, a panful of the beautiful *Cypripedium niveum*, many of the spikes having three flowers, grand examples of *C. Sedenii*, *C. Dominiana*, and *C. Parishii*, which, as grown and flowered here, is a very beautiful species. *Dendrobium Wardianum* was growing hung from the roof, in grand pieces and numerous varieties. In a square little house is growing a large mass of the new *Odontoglossum Londesboroughianum*, one of the travelling Orchids. In another structure were *Ærides quinquevulnerum*, *Oncidium intermedia*, *Dendrobium M'Carthyæ*, and *Utricularia Edressii* in flower. An extraordinary mass of *Oncidium ampliatum majus* was also growing here. Close by was a large plant of the extremely rare *Cœlogyne Parishii*, large *Angræcums*, Pitcher-plants, *Saccolabiums*, &c. In a frame were luxuriating large masses of *Disa grandiflora*, and various hardy Orchids. In a vinery we found specimens of various *Pleiones*, *Vanda teres*, *Anguloas*, &c.; and just off from this house, in a small lean-to, is a collection of *Masdevallias*, in large plants and excellent health. The point of interest in this structure is a specimen of *Oncidium macranthum* with a grand spike. The Bull's-blood form of *Masdevallia Harryana* is also blooming. We had only time to thank Mr Spyers, and run for the train, which we were just in time to—lose. Visitors to Burford Lodge will find two more gardens worth inspecting—the Denbies, just opposite, and the Deepdene. Want of time, in our case, hindered us from seeing these establishments. The next morning I found myself right north of London, close to Harrow, a district unrivalled for its views from many points. The largest garden in this locality is Stanmore Priory, between Edgware and Harrow, and belonging to Sir John Kelk. Owing to the estate being in the market, the most is tried to be got out of it without being too particular as to look. We found some grand *Azaleas* here, apparently potted in loam. Peach crops were in various stages, as also Grapes, and other fruits. Plant-houses were devoted to growing plants for furnishing purposes mainly, the most notable amongst these being a grand lot of deciduous *Calanthes*, the finest we have seen for some time. *Dendrobium nobile* was also well done and in quantity. The conservatory attached to the mansion is a splendid structure, furnished with immense speci-

mens of greenhouse Araucarias, Palms, and Tree-ferns. The roof is draped with climbers. Extending along the front of the mansion and the conservatory is a large flower-garden, where planting out was still being carried on. Several immense pyramids of scarlet Geraniums, Heliotropes, and Clematis, is a feature in this garden: the largest Geranium pyramid is 15 feet high, and proportionate in breadth, and must, when in perfection, be a sight worth going miles to see. The kitchen-garden is also rather extensive, the walls being placed at different angles, in order to secure various aspects for fruit-trees. Of the many other gardens visited in this district there is only space to notice that belonging to Mrs Holland, Stanmore Hall, near the village of Stanmore. This is not an extensive place, but is being remodelled to some extent under the direction of Mr Sidy, the gardener there. The clumps of Rhododendrons and hardy Azaleas are magnificent, though rather past when we saw them. A splendid conservatory, which is also undergoing a complete overhaul, occupies a prominent position in the grounds. In one of the greenhouses Tomatoes are grown in pots, the plants being trained with a single stem under each rafter. When ripe, the clusters of rich-coloured fruit must be exceedingly ornamental, and is one of the best examples of combining utility with ornament we have seen. Vine borders are being re-made, Peach trees lifted and replanted, and stove and greenhouse plants grown on into specimens. Some of the healthiest plants of *Adiantum Farleyense* we have ever seen were growing in loam.

R. P. B.

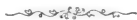
(*To be continued.*)



HIBISCUS COOPERII.

THIS beautiful stove-plant, which ought to be in every collection, is a native of New Caledonia. The leaves are about 3 inches in length and 2 in breadth, ovate, acute at the apex, and finely variegated with green, pink, and white. The flowers are scarlet, and shaped like those of an *Abutilon*. There are few plants more deserving of cultivation than this *Hibiscus*; not only are the leaves beautiful, but when the plant is in flower it is really magnificent. It will strike at any season, provided there is a propagating-pit at command. The cuttings should be taken off about 4 or 5 inches in length, prepared in the usual way, and inserted in pots or pans in silver sand, plunged in a gentle bottom-heat, attended to in watering, and kept shaded until they strike, which is generally in about a fortnight. As soon as they are well rooted they should be potted into pots 2½ inches in diameter, in a mixture of half loam, half peat, with a little charcoal and a dash of silver sand to keep the compost open. They should then be shaded from bright sun until they have taken with their shift; afterwards they should be kept near the glass, in the full blaze of the sun, and liberally supplied with water. When their balls are well matted with roots, their next shift should be into pots 4 or 5 inches in diameter, the same compost being used as previously recommended, with a little well-decomposed cow-manure added.

Always attend to shifting as the plants require it ; but this must not be overdone, or the leaves will be apt to lose their fine variegation. If nice bushy plants are wanted, pinching must be attended to ; but cuttings struck in February or March, and grown on without stopping, make nice table plants by September. GROWER.



SCOTTISH HORTICULTURAL ASSOCIATION.

THE monthly meeting was held in the Hall, 5 St Andrew Square, Edinburgh, on Tuesday evening, the 1st ult., Mr Dunn, President, in the chair. Thirteen new members having been admitted, seven others were nominated for admission at next meeting. Mr James Grieve, Pilrig Nurseries, read a paper on the genus "*Dianthus*," in which he gave an interesting account of the improvements effected upon the various species by florists and hybridisers during the past 200 years. 360 distinct varieties were enumerated by the then celebrated Rea, so early as the year 1676. In treating of these plants, he strongly advised beginners to procure the commoner and more hardy sorts on which to try their "prentice hand." They would thus gain a knowledge of their requirements, and gradually qualify themselves for dealing with the rare and more tender kinds, now regarded by florists of the Glenny school as the finest for show purposes. Carnations, Pinks, and Sweet-Williams, were prominent members of the tribe, and these all required for their full development very similar treatment; and that, in a general way, must be liberal. Well-manured, deeply-cultivated soil, was in all cases indispensable. It was also of the greatest importance that all should be planted out at an early period of the season, and that the utmost care should be exercised to protect them against the ravages of wire-worm, for which he knew no better plan than trapping with Potatoes or Carrots placed in the soil near the plants. Two modes were available for the propagation of named varieties,—first, by cuttings, which he recommended should be put in hand glasses, early in September; and second, by layering, which should be done so early as young shoots could be had. Coddling, under any circumstances, was to be avoided; and while it was necessary to keep the young plants under glass during winter, they should always have a free current of air, even in the severest weather.

Mr A. M'Kinnon, Melville Castle Gardens, followed with a short paper on the "Cultivation of the Strawberry," the leading features of which he described as being, deep trenching, plenty of manure, mulching in the fruiting season with clean straw, keeping the ground free of weeds, and the absence of crops between the rows, so as to permit the full development of the foliage and free access to sun and air. He considered James Veitch to be the best variety for open air cultivation in this part of the country.

Mr Robert Lindsay, Royal Botanic Gardens, read a paper on "Filmy Ferns." These he remarked were widely distributed over the temperate parts of the world. Three species, namely, *Trichomanes radicans*, *Hymenophyllum Tunbridgensis*, and *H. Wilsonii*, were indigenous to Britain. Many admirers of these beautiful plants were deterred from attempting their cultivation from a fancied difficulty in providing the necessary requirements. He had found, however, that they were as easily managed as their congeners. A house with a southern aspect, shaded so as to shut out the rays of the sun, but not so

dense as to exclude light, and a constantly close humid atmosphere were conditions easily obtainable, and in point of fact were the great secret of success. For few or none of the known species was artificial heat at all necessary; on the contrary, they succeeded best when kept cool in winter, and even when subjected to two or three degrees of frost. At the same time, it was desirable to avoid extremes. Soil was of comparatively little importance, so long as it was of a light porous character, and the pots well drained. Interesting discussions followed the reading of the several papers, and the usual votes of thanks were accorded to the writers.

Among the plants and flowers on the table for exhibition were a collection of Fancy Pansies, from Messrs Downie & Laird, including two new varieties called Miss Talbot and Estella, which the Floral Committee recommended to be shown again. Messrs William Gordon & Sons had a crimson *Petunia*, of a remarkably dwarf compact habit of growth. Messrs Thomas Methven & Sons exhibited a fine collection of Regal and Forcing *Pelargoniums*, the most striking of which were *Triomphe de St Maude*, *Digby Grand*, *Beauty of Oxtou*, *Fire King*, *Dr Masters*, *Annie*, and their fine new white variety *Countess of Rosebery*. Messrs Dickson & Co. sent a large number of interesting things, including branches of the new golden-leaved *Laburnum*; Paul's double *Crimson Thorn*, *Alnus imperialis*; *Purple-leaved Peach*; New Silver variegated *Ash*, *Rosa rugosa*; trusses of greenhouse and hardy *Rhododendrons*, alpine plants, and *Viola* blooms. Mr John Dick, Avenel House, showed a fine specimen of the beautiful *Primula capitata*; and Mr A. Nisbet, Gibraltar Villa, a new blue *Lobelia* named *Jeannie Deans*. It was intimated that at next meeting papers would be read by Mr A. Kerr, on "Forcing Dutch roots;" by Mr John Cowe, on "The Hyacinth;" and by Mr George M'Kinlay, on the "Cultivation of the Pear."



ROYAL CALEDONIAN HORTICULTURAL SOCIETY.

THE summer exhibition of the above Society was held in the Waverley Market on 9th July, and seldom, indeed, has any of the shows of the Society been held under more unfavourable circumstances as regards weather. The very unpropitious climate which had prevailed for such a long time seemed to reach the culminating point, as it was almost a continuous downpour of rain the whole day. Notwithstanding so many drawbacks, the show was a very successful one—in some respects, even better than any similar show of the Society. This was largely due to the grand turn-out of nurserymen and florists, for whose exhibits eight additional 20-foot tables had to be provided. A magnificent assortment of plants, consisting of the finer varieties of *Rhododendrons*, Standard Sweet-bays, and the fine kinds of *Thujas*, *Retinosporas*, &c. &c., numbering many hundreds of plants, all in pots and tubs, were ranged along the circular space in front of the aquarium. These were furnished by the Lawson Company, and were awarded a special prize of £10. Besides this, the same firm furnished one of the large tables with *Roses* in pots, *Rhododendrons*, *Pelargoniums*, *Heaths*, *Tree-Ferns*, and foliage plants. On this table we noticed some nice pans of the hardy *Orchid*, *Orchis foliosa*.

The next long table was furnished by Ireland & Thomson with beautiful *Crotons*, *Dracænas*, *Caladiums*, tuberous *Begonias*, *Spiræas*, *Petunias*, and a

splendid lot of plants suitable for room and table decoration ; also cut Roses, and Orchids in bloom.

The next table was very effectively furnished by Downie & Laird, and consisted of Palms, Rhododendrons, Gloxinias, Pelargoniums, Ferns, Heaths, and other flowering and foliated plants ; also an assortment of blooms of Pyrethrums, Pansies, and bedding Violas. A table furnished by Messrs Methven & Sons consisted of beautiful Pelargoniums, Heaths, Tree and other Ferns, Palms, &c. Conspicuous on this table were a large number of the New Zealand Filmy Fern (*Todea superba*), and a collection of cut blooms of Iris. The last of the large tables in the centre of the market was furnished by Dicksons & Co., Waterloo Place, and was made up of Tree-Ferns, Pelargoniums, and foliate plants ; also a large display of Pansies, Violas, Geraniums, Pyrethrums, herbaceous plants, and alpine plants.

One of the most interesting tables in the show was furnished from the Botanic Gardens, and consisted of Pitcher-plants, Darlingtonias, Sarracenias, Droseras, *Dionæa muscipula*, Filmy Ferns, a large specimen of the Elk-horn Fern (*Platycerium grande*), and a beautiful specimen of the Lattice-leaf plant of Madagascar ; also a large basin filled with the water-plants *Pistia stratiotes* and *Pontederia crassipes*. It is to be hoped that this or similar collections may be exhibited on future occasions, as they attracted a very great amount of attention.

For the table of plants in the gardeners' section, three competitors entered the lists—viz., Mr James Spence, Grange ; Mr Robert Grieve, Falcon Hall ; and Mr A. Stalker, St Roque. The prizes were awarded in the order named. The tables were all beautifully arranged, and the judges had some difficulty in awarding the prizes. They consisted generally of Palms, Dracænas, Crotons, Ferns, Heaths, Pelargoniums, Achimenes, Fuchsias, Petunias, &c. &c. A very showy table came from Drummond Brothers, George Street, and consisted of well-bloomed plants, in 5-inch pots, of the finest kinds of Pelargoniums, set in a groundwork of small plants of *Adiantum cuneatum*, and edged with a very fine *Lobelia* named "Brighton."

A similar table at the opposite end of the market was furnished by John Makenzie, florist, Grange Loan, on which were some very fine Petunias, Fuchsias, and a large quantity of bouquets for hand, table, and button-holes. A table consisting of Palms, Ferns, and cut flowers was also exhibited by Todd & Co., Maitland Street. As usual, Mr Robertson Munro, of the Abercorn Nursery, sent a very interesting display of hardy herbaceous and alpine plants, and also a box of cut Roses.

The greenhouse flowering-plants were not up to the usual standard, though some good specimen Heaths were shown, but not well flowered. The same may be said of the Pelargoniums. Some well-grown Fuchsias were exhibited in 9-inch pots, which were of considerable merit. The show of fruit was a very small one, only one collection of six sorts being staged, and which came from Mr Johnstone, Glamis, but as usual was very fine. Some excellent Peaches, Nectarines, Figs, and Melons were also shown. Very few vegetables were shown, and those poor in quality.

In cut flowers, Mr Dickson, Belmont, Belfast, was to the front with his Roses, very little inferior to those usually exhibited by him. There were some nice boxes of Tea-Roses shown also. The arrangement of the tables, &c., was chiefly under the superintendence of Mr M'Leod of the City Gardens, who carried out a new feature in the way of large hanging-baskets suspended from the girders, and draped with Palms, Ferns, sprays of Ivy, Box, and

other evergreens: the effect was very good indeed. Large specimen Palms from the Botanic Gardens were dotted at intervals over the bare spaces on the floor, which also looked well.

We must not omit to notice a collection of cool Orchids, exhibited by Mr M'Gregor, Braefield, Lanark, which consisted of *Odontoglossums vexillarium*, *cirrhosum*, *Alexandre*, and *Bluntii*. The British and Exotic Ferns were a strong feature of the show—some grand examples of *Adiantum gracillimum*, *A. Farleyense*, *A. Flemingii*, &c., being shown; and the British Ferns exhibited by Mr M'Cormick, Canaan Park, were very good. The competition in table plants was also a strong one, and were very good and healthy.

The judges were Messrs Anderson, Oxenford; Priest, Newbattle; Cowe, Morningside; Gray, Eglinton Castle; Garrett, Whittinghame; Lindsay, Botanic Gardens; Currie, Edinburgh; M'Farlane, Edinburgh; Gorrie, Mouldslie; and Kettles, Archerfield. Owing to the very rainy weather which prevailed, the attendance between twelve and two was but meagre. In the afternoon, however, it greatly improved, and before five o'clock the market was fairly filled. In the evening also there was a large turn-out. The band of the Inniskilling Dragoons was in attendance both in the forenoon and evening, and played a popular selection of music.

The following are the awards:—

GARDENERS AND AMATEURS.

Table of Plants, 30 feet by 5—1, J. Spence, Grange; 2, Robert Grieve, Falcon Hall; 3, A. Stalker, St Roque.

Four Stove or Greenhouse Plants, in flower.—1, A. Paul, Gilmore Place; 2, J. M'Cormick; 3, J. Bauld.

Two Stove or Greenhouse Plants, in flower.—1, A. M'Kinnon, Melville Castle; 2, J. Spence.

Six Foliage Plants, exclusive of Ferns.—1, J. M'Cormick; 2, G. Gordon; 3, T. Macdonald.

Two Foliage Plants, exclusive of Ferns.—1, A. M'Kinnon; 2, A. Scott.

Four Foliage Plants, in pots not exceeding 9 inches.—1, S. Grahame; 2, G. Gordon; 3, T. Macdonald.

Six Plants for table decoration, 6-inch pots.—1, E. Tate, Balcarres, Fife; 2, J. M'Leod, Stirling.

Two Orchids in bloom.—1, A. M'Gregor, Lanark; 2, D. Cameron, Liberton.

One Orchid in bloom.—1, A. M'Gregor; 2, James Spence.

Four Palms.—1, G. M'Lure, Trinity; 2, G. Gordon.

One Palm, Specimen.—1, J. M'Cormick; 2, J. Spence.

Three *Dracaenas*.—1, J. Spence; 2, G. M'Lure.

One Cycad.—1, C. Smith.

Four Cape Heaths, distinct sorts.—1, A. M'Kinnon; 2, A. Paul, Gilmore Place.

Two Cape Heaths, distinct sorts.—1, Charles Smith.

Two *Caladiums*.—1, G. Gordon; 2, G. Greig.

Two *Coleus*.—1, G. Gray; 2, S. Grahame.

Two pots *Amaryllis*.—1, A. Paul; 2, G. Macrae; 3, T. Macdonald.

Two *Adiantums*, sorts.—1, S. Grahame; 2, A. Paul.

Two pots or pans *Lycopodium*, different sorts.—1, J. Cossar; 2, S. Grahame.

Six British Ferns, distinct varieties.—1, J. M'Cormick; 2, H. M'Kenzie.

Eight Dwarf Ferns, distinct pots not exceeding 6 inches.—1, A. W. Anderson; 2, G. Drummond and W. Dickson, equal.

Two *Fuchsias*, in pots not exceeding 9 inches.—1, J. Walker; 2, H. M'Kenzie; 3, J. Bauld.

Two tricolor *Geraniums*.—1, R. Johnstone; 2, T. Macdonald.

Two bronze *Geraniums*.—1, R. Johnstone; 2, S. Grahame.

Two white-edged *Geraniums*.—1, R. Johnstone; 2, S. Grahame.

Four *Pelargoniums*, sorts, Show or French varieties.—1, J. Spence; 2, C. M'Farlane; 3, T. Macdonald.

One *Pelargonium*, Show or French variety.—1, J. Spence; 2, C. M'Farlane.

Three Fancy *Pelargoniums*.—1, T. Macdonald; 2, J. Spence.

Four *Calceolarias*, sorts.—1, C. Macfarlane; 2, C. Smith.

Four Balsams, two sorts at least.—1, W. Rae, Millburn Tower.

Two Hand Bouquets.—1, Miss M'Laren; 2, James Bauld.

Two pots or pans *Achimenes*, sorts.—1, W. Manson, St Leonards; 2, J. Spence.

Four pots or pans Gloxinias.—1, S. Grahame; 2, T. Macdonald.

One pot *Lilium auratum*.—1, G. M'Lure; 2, A. Paul.

Two *Saxifraga pyramidalis*.—1, T. Bowman; 2, G. M'Lure.

Two pots *Clematis*, in bloom.—1, H. M'Kenzie.

One pot *Clematis*, in bloom.—1, H. M'Kenzie; 2, G. Brown.

Two plants *Carnation Souvenir de la Malmaison*.—1, J. Walker, Rosehall House.

Twelve Alpines, in flower.—1, Mr Drummond, Grange Loan; 2, C. Smith, Kestalrig.

Six Alpines, in flower.—1, J. Bauld; 2, H. M'Kenzie.

Twenty-four cut Roses, of sorts, excluding Tea.—1, W. Parlane, Roselea Row.

Twelve cut Roses, of sorts, excluding Tea.—1, W. Parlane.

Six cut Roses, of sorts, excluding Tea.—1, R. Johnston, Woolmet; 2, A. Stalker.

Twelve cut Tea Roses, not less than six sorts.—1, W. Parlane; 2, A. M'Millan.

Six cut Tea Roses, not less than three sorts.—1, T. Bowman; 2, G. L. Brown.

Centre-piece of Cut Flowers and Foliage for dinner-table decoration.—1, Miss M'Laren.

NURSERYMEN.

Forty-eight cut Roses, of sorts.—1, Hugh Dickson, Belfast; 2, T. Smith, Stranraer; 3, J. Bryson, Helensburgh.

Eighteen cut Roses.—1, H. Dickson

Twelve herbaceous Plants.—1, Dicksons & Co.

Six table Plants.—1, J. Bryson.

Four Roses, in pots.—J. Bryson.

Two Roses, in pots.—J. Bryson.

Twelve Alpines.—1, Robertson Munro, Abercorn Nursery; 2, Dicksons & Co.

Six *Dracenas*, in pots not exceeding nine inches.—J. Bryson.

Two Tree Ferns, four feet stem.—Dicksons & Co.

Fruit.

A collection of Fruit, six sorts.—G. Johnston.

One Pine Apple.—1, Mr M'Intyre; 2, J. Laing.

Two bunches of Grapes, black Hamburg.—1, Mr Carruther; 2, J. Boyd.

Two bunches of Grapes, black, any other sort.—John Laing.

Two bunches of Grapes, white, any sort.—1, Mr Carruthers; 2, J. Laing.

Six Peaches.—1, A. Anderson; 2, F. S. M'Kinnon.

Six Nectarines.—A. Anderson.

One Melon.—1, G. Johnston; 2, John Laing.

Twenty-four Cherries.—1, T. Bowman; 2, Charles Smith.

A basket Strawberries.—G. Johnston.

Dish of Figs, six fruits.—1, A. Anderson; 2, J. Laing.

Vegetables.

Collection of Vegetables, eight sorts.—1, G. Potter; 2, T. Bowman.

Two Cauliflowers.—1, T. Bowman; 2, G. Potter.

Two Cucumbers.—1, J. Shearer; 2, A. Anderson.

Twelve Round Potatoes.—1, G. Potter; 2, T. Bowman.

Twelve Kidney Potatoes.—1, G. Potter; 2, T. Bowman.

Thirty pods French Beans.—G. Potter.

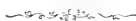
Twelve Early Horn Carrots.—1, G. H. M'Culloch; 2, T. Bowman.

Six Lettuce.—1, J. Boyd; 2, G. M'Lure.

SPECIAL PRIZES.

A. Carruthers, for two large *Dracenas*.
A. M'Millan, for trusses of *Geranium*.

Mr M'Gregor, Lanark, for Orchids.



NOTICES OF BOOKS.

POTATOES: HOW TO GROW AND SHOW THEM. By James Pink. Crosby Lockwood & Co., London.

MR PINK has in this handy volume gone very fully into the practical routine of the preparation of the soil, and all other matters relating to the high-class

culture of the potato, by following which he has been among the most extensive and successful exhibitors of potatoes. Those who want to be equally successful cannot do better than consult this volume, it being an embodiment of the practice which has brought so much success to its author.

THE ORCHARD-HOUSE (BY THOMAS RIVERS). Sixteenth Edition. Edited and arranged by T. Francis Rivers. Longmans & Co.

WHEN a work has reached its sixteenth edition, it seems almost superfluous to notice it. It is well known that the author of this work, the late Thomas Rivers of Sawbridgeworth, was the originator of the cultivation of fruit-trees in pots in cool glass-houses on an extensive scale and in a systematic style. The enterprise in his hands has been thoroughly successful, and the practice that resulted in success is very fully and clearly embodied in this volume. It is not a mere epitome or skeleton of his methods of procedure. It is a very elaborate and complete treatise, embracing all that relates to the construction of suitable houses, and the potting, training, and after-management of Apricots, Peaches, Nectarines, Plums, Pears, Figs, Grapes, Oranges, Cherries, &c. &c., in pots. Almost every branch of the subject is clearly illustrated with woodcuts. Any one interested in the Orchard-house system of fruit-growing in pots cannot have a better guide than this nicely-got-up volume.



Calendar.

KITCHEN-GARDEN.

THE very important operation of planting the stock of vegetables for winter and spring supplies is generally completed by this time; but where ground is limited in proportion to the demand for garden produce, various methods have to be adopted to meet the case. Many have to keep their Broccolis, and all other of the Brassica kinds, in store plots of ground till there is a clearance of other crops, and the necessary preparation made for permanent planting. Broccoli may be lifted and transplanted when nearly fully grown, and be greatly improved by the operation. It firms the tissues of the plants, and enables them to stand severe weather much better. Ground may, as it becomes vacant, be planted more thickly (with such sorts as Kale, Brussels Sprouts, and Savoy) now than when done during June and July. Strawberries which have stood three years may be trenched down, and the ground will answer well for Coleworts, Spinach, Lettuce, or winter Onions. By being

well drained by trenching, and a large quantity of trimmings of the Strawberries, with the mulching, turned to the bottoms of the trenches, the soil is kept open, and water allowed to pass freely from the plants when there is great abundance of rain or snow. Stagnant moisture kills more plants than severe frost. Artichokes (Globe) should not be allowed to flower; but as soon as the heads are at their best they should be cut, so that the plants may not be unnecessarily weakened. Artichokes grown on extra rich land, or by frequent applications of manure-water, are finer in quality, and more tender, than those grown on starved and crowded plants. Each plant should stand well clear of its fellow, and have the heads reduced in number when too many show themselves. Asparagus should not be allowed to become crowded, especially if the crowns are to be forced. They should have plenty of light and air among them. If they are prevented from flowering, they

will be all the better for the trouble taken in them. French Beans may be planted on warm borders, to be covered by frames when there is danger apprehended from frost. Where early Cucumbers or Melons are cleared off, with a portion of the surface-soil removed to prevent red-spiders from establishing themselves, French Beans would find good quarters, and come in well during the autumn, when they would be safe from frost. Osborn's, William's, Sion House, and Newington Wonder are first-rate kinds for present sowing. Beet left thickly for drawing young should be treated systematically. They should be gone over, so that thinning may be done by taking the largest roots first. Such early lots are supposed to be all used during the next two months. Cabbage may be sown again this month once or twice: a number of small plants pricked in sheltered quarters, and allowed to stand the winter, will turn in for spring planting, and would make a capital succession to autumn-planted stock. Rich, deeply-trenched ground is of primary importance when fine spring Cabbage are wanted. Sow for supply of Red Cabbage plants. Where Cabbage-sprouts are in much request, it is a good practice to get the whole plot well trimmed off, and give a mulching of manure. Carrots should have a final thinning. Though they may have hitherto had the best only taken as they were required for use, it is not well to leave them crowded after this time. If grubs should attack them, copious waterings of guano-water, soot-water, or other liquid manure, will help to destroy them; but when the vermin are established, nothing will reach them without destroying the roots. Cauliflowers, to stand the winter, protected by frames or in sheltered positions, may be sown twice during the month, though once answers well. It is safe to have more than one lot to fall back on. Three kinds may be sown, and when they are planted out in spring in one plot they make a succession.

Celery may be earthed-up as the plants require it. Though it is considered a good system by many to "earth-up" all at once, we think that the heads become more solid and crisp when they are earthed-up piecemeal as they grow. Plenty of manure-

water may be given; a good mulching after the plants are started will do much to cause a free growth. Late plantations may still be made. They may not come large, but they last far into the season, and do not readily run to seed. We have had capital Celery in June from August plantations, the kind answering the purpose best being dwarf Imperial. Mustard, Cress, Radishes, Corn Salad, and other kinds, should be sown under glass protection after the middle of August. Sow at least once a fortnight; and for the sake of order, do not allow half-used-up crops of Salad to remain on the ground: better to have the ground left uncropped than to be an eyesore, with remains of crops standing, decaying, and becoming offensive. Lettuce may now be planted in quantity. Sow more kinds twice or three times during the month. Bath Cos is excellent for present sowing. Batavian Endive may be planted out in quantity. When carefully blanched, it is greatly valued for its nutty flavour. A sowing of all kinds of Endive may be made. They will stand the winter, and last long in the season. Dandelion (broad-leaved) and Chicory should now be plentiful, and may be lifted and placed in quarters to blanch for use next month, should there be a demand for these. Leeks may have plenty of manure-water; and a good mulching of rotten manure would help to blanch them, and materially aid them in forming their growth. Mushrooms are not likely to be plentiful after such a cold and wet season, therefore it is necessary to have a bed started to meet the demand. A mixture of turfy loam and some sheep-manure in the Mushroom-bed is good material to give thick solid Mushrooms. Plenty of horse-manure, with a minimum of straw in it, is the manure most desirable to grow good Mushrooms in, and a cellar is the most suitable place to grow them. Mushroom-houses should be underground, and there would then be no necessity for artificial heating with pipes. The "fly" which is so troublesome during summer, by depositing its larvæ, which ruin young Mushrooms, is easily combated with when the crops are underground. Onions may be sown from first of month to the middle of it. Ground for these should be rich

and well trenched. Sow in drills from 12 to 18 inches apart.

Soot or wood-ashes pointed into the surface of the soil is a preventive of vermin, and excellent for the Onions. They should not be sown too thickly, as they are liable to become drawn up and weakly for want of air, and do not stand the winter so well, and more likely to run prematurely to seed in spring.

Potatoes should be lifted when their tops show signs of changing colour: dry them and store in pits in the usual way. Parsley should be well thinned, and plant the finest curled plants in a sheltered position, where protection can be given during winter when snow and severe frost are prevalent. Last winter caught many "napping" with short supplies of Parsley, and the long cold spring did not do much to hasten young sowings. Lift Shallots and Garlic as they indicate ripeness: hang them up in dry, airy quarters to become firm, preparatory for keeping. Seeds of all kinds may be harvested dry, and kept cool and airy. Choice kinds of vegetables which cannot be had true may be saved in gardens; but the practice in a general way is profitless and troublesome, as fine produce, and the best of it, cannot be had for use in the kitchen and seeds raised as well. Nevertheless, we save a small

portion of something choice yearly. Top Peas which are growing too much to straw; hitherto these have had abundance of rain, and little use for mulching (July 14).

Tomatoes must be kept well thinned of shoots and fruit; give abundance of liquid manure to those swelling heavy crops of fruit; look after birds and wasps on these. Spinach may be sown twice or three times during the month; the first to be round Spinach, the rest prickly. Dust soot and lime over the surface after sowing has been done. Wood-ashes is capital for prevention of vermin; soaking the drills with soap-suds or guano-water helps to prevent the ravages of grubs, &c. Turnips may yet be sown for winter use. In very southern and warm districts some sow Turnips as late as September; white and red stone are good kinds. Hoeing and cleaning the ground must now have special attention. Though some can boast of securing "excellent" crops with weeds equally luxuriant, we cannot sympathise with such cultivators, any more than with the peasant who told us that he had "excellent health, though brought up among muck all his days." A clean garden closely cropped with good vegetables at this season is a credit; the reverse is a disgrace.

M. T.

FORCING DEPARTMENT.

Pines.—By the end of this month early Queens intended for starting into fruit next January and February should have their pots well filled with roots, and be strong and well matured in growth. They should now be managed so that they neither make much more growth on the one hand, nor on the other be allowed to receive any violent check. It requires a nice adjustment of circumstances to have these plants in proper condition. To have them "pot-bound" too early, and subjected to a high temperature throughout the autumn, would either cause them to fruit prematurely, or they would show fruit very early in the year which would be a mere abortion, and come to nothing. The temperature should therefore be decreased gradually as the days shorten. The amount of moisture in both the

soil and air must be correspondingly lessened, but not to such an extent just now as is quite safe in the dead of winter. That portion of the stock of Queens intended to make a growth in spring before starting must still be encouraged to grow as directed last month. Smooth Cayennes, and other late-fruited sorts that are now out of flower, must be encouraged with copious waterings of guano-water when they require it, to keep the soil steadily moist. Keep the atmosphere damp by means of sprinklings, and at shutting-up time syringe the plants overhead—missing as much as possible the crowns; also damp the surface of the bed and all about the collars of the plants with the syringe. Let the heat run up for a time to from 85° to 90°, with sun-heat after shutting up; and use fire-heat

sufficient to prevent it falling below 70° before morning. Give fruit that are colouring plenty of air. Keep them drier than plants swelling their fruit, but avoid drying them off entirely at this season. Smooth Cayennes, and other sorts in younger stages that are growing freely, should be supplied with fresh air sufficient to prevent their drawing; and see that they get no check for want of water. Syringe them gently on bright afternoons when shut up, and give air in the morning as soon as the heat exceeds 75°. Suckers on plants that have fruited up to this time will now be strong and ready to pot. Put them in 7 or 8 inch pots, according to their size. Drain the pots well, use a rather light fibry loam, and pot firmly, plunging them in a bottom-heat of 90°. Keep them rather close and moist, and shade them in the heat of the day till they make roots. Then water well, and inure by degrees to full light and air.

Grapes.—Where the wood of early Vines from which Grapes were all cut in May is thoroughly ripe, let all repairs in the way of painting, reglazing, and any alterations in the heating contemplated, be attended to forthwith. Continue to put former directions in force in order to keep the foliage clean and healthy. Late Grapes now swelling off should have copious supplies of water if the weather be dry. Vines that have been bearing heavy crops for years should be nourished and stimulated by sprinkling guano on the surface of the border before watering it. This, alternately with the drainage from cow-houses or stables in a diluted state, will greatly benefit such Vines. On damp, dull days put more or less heat into the pipes to keep the air moving, and never shut the houses up closely, either by night or day. Owing to the backwardness of the season, crops in general may require more fire-heat to ripen them thoroughly by the end of September. Take every precaution to keep flies and wasps from ripe Grapes, or they will soon disfigure them. There is no better way than to fix Hawthorn's netting over the ventilating openings. Keep a constant lookout on Vines in all stages, and see that red-spider does not gain a footing. There are few better preventives than a circulation of fresh air night

and day. Remove all lateral growths from Vines now swelling their crop; and in the case of Gros Colman, all lateral leaves may be removed soon after colouring begins. We have noticed that all bunches of this Grape well exposed to light colour the best. In the case of Vines which may have their roots deep in the border, a good means of enticing the roots to the surface is to remove all surface soil down to the roots as soon as the crop is cut, and to replace it with a layer of eight inches of turfy loam, with a third of horse-droppings and a sprinkling of bone-meal. The roots will work up into this rich fresh soil; and in the case of early Vines the roots will continue to do so in spring, especially if some warm litter and leaves be applied to the surface of the border when forcing commences. Pot-Vines intended for fruiting early next year should by the end of this month have their wood hard and brown, with well-developed buds. Expose them to the full sun, and a free circulation of air to carry on the ripening process to completion. Remove all attempts at lateral growths; and the pots being now crammed full of roots, see that they do not suffer for want of water.

Peaches.—One of the greatest evils in Peach-growing is that of tying in more young wood than there is ample room for. Look carefully over all trees, and where the leaves are crowded, and shading each other and the wood, do not hesitate to remove superfluous shoots. This should especially be seen to as the crop is gathered from each tree, so that light and air can play freely about every bud. Syringe all trees from which the crop is gathered; and if there be any spider about them, mix a handful of sulphur with the water. See that all trees swelling off full crops are well supported with copious waterings of liquid manure in dry weather. Look over ripening crops twice daily in sunny weather, and gather all fruits that are ready for table. If to be packed and sent by rail, do not let the fruit be too ripe. Expose ripening fruits to the full sun by pushing aside any leaves that partially shade them. Continue to syringe late varieties in cool houses every fine afternoon, and see that all such that have their roots in inside borders are well watered.

Figs.—Keep early trees in pots, from which the second crop is all gathered, free from insects by frequent syringings. These may now be placed out of doors in a warm sunny exposure, where their leaves will not get damaged with winds. Should they be the least crowded with wood, remove all the weaker shoots that is necessary to regulate and properly thin them. Trees in borders now swelling their second crop should be well watered with guano and dung water: a fresh top-dressing of fresh manure will also be of much benefit to them. Keep a circulation of dry warm air about those that are ripening, so as to properly develop the flavour. See, however, that while this treatment is carried out, the border does not become too dry. Except where fruit are ripening, continue to syringe the trees every fine day at shutting-up time.

Melons.—Expose ripening fruits as much as possible to full sun; and should the weather be bright, do not allow the soil to become over-dry and crack as the ripening process goes on. Give all plants swelling off their crops waterings at intervals, and in sufficient amount to prevent the soil from cracking. Syringe the foliage when the house is shut up, and give artificial heat to keep the temperature from falling below 70° at night. Shut up in the afternoon early enough to run the heat up to 85° or 90° for a time. Impregnate late crops at midday when the pollen is dry, and do not allow

the plants to become crowded with young growths.

Cucumbers.—Plants that have been in bearing since early spring, and that are somewhat exhausted, should now be partially cut back, removing all the oldest growths, and have a top-dressing of manure and loam in equal parts put on their roots. Keep them at 75° at night, and syringe freely when shut up at 90° on fine afternoons. Thus treated, they will soon recruit, and continue to bear till late autumn. Give plants in full bearing water sufficient to keep them fresh and crisp in all their parts. Regulate their growths, and stop at every point. About the middle of the month is a good time to sow for winter-bearing plants. It is desirable to get strong healthy plants while the days are long, and comparatively little artificial heat is required.

Strawberries in Pots.—These, if shifted into their fruiting-pots last month, and have been managed as directed in last month's calendar, will grow with great rapidity and vigour this month if it be bright and warm, and will require to be liberally supplied with water and occasional waterings of liquid manure. If they are crowded in any way, thin them out and give them more room, so that they get plenty of light and air about their leaves. They may be sprinkled overhead about five o'clock on the afternoons of warm days. Keep them clear of weeds and runners.



Notices to Correspondents.

All business communications and all Advertisements should be addressed to the Publishers, and communications for insertion in 'The Gardener' to David Thomson, Drumlanrig Gardens, Thornhill, Dumfriesshire. It will further oblige if all matter intended for publication, and questions to be replied to, be received by the 14th of the month, and written on *one side* of the paper only. It is also requested that writers forward their name and address, not for publication unless they wish it, but for the sake of that mutual confidence which should exist between the Editor and those who address him. We decline noticing *any* communication which is not accompanied with name and address of writer.

R. LOGAN.—Your specimen came in good condition this time. It is *Spiræa lœvigata*, a native of Siberia.

S. BIGHAM.—What you describe is a common enough occurrence in the Laburnum. We do not know of any satisfactory way of accounting for it.

T. A. MITCHEL.—The Iris-blooms, &c., were all decayed before they reached us, not having been sent direct to us. We cannot, however, undertake to name mere varieties.

T. S. K.—We cannot undertake to name Roses, especially when received in bad condition, as yours were.

E. S.—Your specimen arrived so shrivelled that we could not recognise it, but suspect it is a *Gillardia*. We are willing enough to do our best in naming specimens sent us, but do not profess to be able to name shrivelled morsels of plants, nor to get any one else to do so.

AN OLD SUBSCRIBER.—The reason of the blistering or curling of your Peaches and Nectarines is cold and wet. We know of no remedy. If the season gets warmer they will most likely grow out of it and drop the worst leaves. To prevent it, cover them with glass and make a better climate for them.

A. H.—Remove the musk and destroy as many of the borer as you can find. Large foliage on Vines—as in your case—is not always accompanied with superior or abundant crops of Grapes. There is, however, no reason why you should not have good crops. We suspect the roots of your Vines are sinking far from the surface of the border, and that the wood has not been well ripened. If you raise the roots, put them into good soil, not over rich, and ripen the wood thoroughly; it will remedy the evil.

A. S.—Grow your *Ixias* in two parts peat, one part leaf-mould, and one part sand, and in a cold pit, frame, or greenhouse, near the glass. *Sparaxis* require similar treatment.

THE GARDENER

SEPTEMBER 1879.



THE COLDNESS OF THIS SEASON AND NEXT YEAR'S FRUIT - CROPS.



ACCORDING to the verdict of the Scottish Meteorological Society, the mean temperature of the first six months of this year has been lower by 5° than any corresponding period of any year since 1763. So that it is quite safe to say that no gardener living has had to contend with such clouded skies and low temperature. It is very remarkable that the highest temperature registered here (Nithsdale, Dumfriesshire) for last July was 71° , while the mean of the maximum daily temperatures for the month was a fraction over 60° , and June was slightly colder than July. On the morning of the 10th of August the temperature fell to 34° in a sparred case four feet from the ground, and on low-lying grounds the grass was actually crisp with frost.

The exceptional character of the season will, as a matter of course, leave horticulturists a legacy of exceptionally unfavourable circumstances as bearing on next year's crops to contend with and overcome. Perhaps there is no condition upon which satisfactory crops on all fruit-bearing plants depend so much as on the perfect ripening of the wood and buds, from which the future crop must come, and it is thus a condition which all experienced cultivators strive to attain. Last year being bright and warm, without any extremes that were calculated to injure vegetation, the result has been very manifest this year in the unusual crop of blossom on all flowering trees and shrubs. Unhappily, however, the fruit harvest—owing to the unfavourable character of this season—will rank amongst one of the most unsatisfactory on record. And unless the autumn be one of unusual bright-

ness and warmth, it is hopeless to expect fruit-bearing plants to ripen their wood and buds, so that we can look to next season as one of promise.

Amidst the many failures of this year, the Grape crop is—so far as we have observed—about the most satisfactory of any, even under glass. As a rule, all the Vines and Grapes that we have seen are looking well as regards the extent and quality of the crops they are carrying. This may sound anomalous in the ears of the inexperienced. There can be no doubt that much of this success depends on the splendid weather of the latter part of last summer and autumn, which, as has already been referred to, resulted in the thorough maturation of the wood and fruit-buds. Indeed, we have been cognisant of cases where last year's Grapes shrank badly, and did not colour well, notwithstanding the warm sunshine. The year 1877 was not at all a favourable season for the Vine, in so far as the following year's crop was concerned, and in many cases the bunches were loose, the footstalks of the berries weak and long, and the heat of 1878 hurried the crops to maturity—and all these are calculated to precipitate shanking where there is a predisposition to that evil. The same Vines have this year brought heavy crops of large but compact bunches to maturity without any shanking, in spite of the want of sun and excessive rainfall. The often reiterated lesson of well-ripened wood is, to our mind, not the only lesson which such an occurrence enforces. It points also to the fact that, as a rule, strong Vines in well-prepared borders do not get nearly enough of water in summers that are dry and hot. The better and more carefully borders are prepared—as to drainage, &c.—the more forcibly does this apply; and if this exceptional season teaches one lesson more emphatically than another, it is that Vines under other conditions the most favourable rarely get as much water as is good for them in dry, hot summers—of course, always provided there is no chance of stagnant water about the borders. These hints are thrown out by the way, and we think our experienced readers will endorse them.

The important task then for this autumn is for cultivators to do everything that lies in their power to ripen the wood of not only Vines but Peaches, Figs, and all fruit-bearing plants, as well as possible. Outdoor fruits are comparatively beyond the pale of artificial appliances to forward this end. Much, however, can be done to ripen the wood of Vines, Peaches, &c., that are under glass. As a rule, the greatest danger of immaturity is in the case of vigorous Vines and other trees from which the crops are all gathered this month. Earlier trees get a longer season, and usually ripen more completely. On the other hand, later Vines, on which Grapes hang through the winter months, have so much fire-heat applied for the preservation of the crop, that the wood also reaps the benefit of a circulation of dry, warm air. Strong Vines, from which the Grapes are cut this and next month, are more frequently

left to take their chance of what ripening the season accomplishes without artificial aid. Experienced growers are not likely to neglect the use of the means at their command, but it may be necessary to urge on the inexperienced the absolute necessity that this year exists to apply fire-heat, and keep up a circulation of dry, warm air about the wood and foliage for the next month or six weeks, or in fact until the wood is solid and brown. The character of next year's crops depends greatly on this: indeed it will give the foundation of the superstructure of next year's crop, which it is impossible to rear without it. Experienced men are alive to this necessity this autumn, if ever they were. In some cases indeed the fuel may be grudged, and gardeners would do well in such cases to point out to their employers the necessity for such means, and the consequences of withholding it.



LUCULIA GRATISSIMA.

THIS is a magnificent evergreen shrub or tree, found growing in great luxuriance on some of the smaller hills in the Valley of Nepaul, and generally in rather exposed situations, where it produces its sweet-scented, delicate, pink-coloured flowers in profusion nearly the whole year round.

It is surprising how very few places include this grand old plant. It is only met with occasionally in old-established places where the glass structures are on a large scale, and in nurserymen's collections. This ought not to be the case. Considering the merits of the plant and the easy way in which it can be grown and flowered, one fully expanded truss of flowers being enough to fill a whole house with its perfume. Cuttings of the young firm shoots, taken off with a heel, or at the third or fourth joint, and inserted thinly round the edges of 4-inch pots, in a compost of light loam, peat, and leaf-mould, with a good addition of sharp sand, made firm, and plunged in a brisk bottom-heat, strike very freely if covered with a bell-glass. They must be carefully attended to as regards watering, shading, &c.; and as soon as they are fairly rooted, turn them out of the cutting pots very cautiously, so as not to break any of the young fibres, and pot them singly into 3-inch pots in soil composed of equal parts of fibry peat and light turfy loam, with a liberal addition of silver-sand and charcoal broken up into small bits and well mixed together.

After potting plunge them in a gentle hotbed, and water them with water a few degrees warmer than the propagating-bed, to help to warm the soil in the pots, and shade them from strong sun, and keep them close for a few days until they show signs of animation, after which the shading can be dispensed with, and the temperature

and moisture can be nicely balanced by putting on a chink of air in the morning, when the thermometer reaches from 55° to 60° , and increasing it gradually, shutting up again early in the afternoon with plenty of sun heat, giving them a gentle syringe with tepid water before doing so.

As soon as the roots reach the sides of the pots they should be shifted into 5- and 6-inch ones, according to the size of the individual plants. After this shift a hotbed is not a necessity, as the plants will do well if placed in a warm house on a shelf or other place near the glass, where they can have abundance of light and air to enable them to make firm short-jointed growths, which should be pinched and regulated by tying them to small stakes, so as to make sure of a nice bushy form. We do not give them very large shifts, as they are apt to grow too rampant, and with too much moisture are sometimes shy to flower, so a couple of inches at a time is quite enough, the last shift being into 10- or 12-inch pots, which will be quite large enough to flower them in if extra large specimens are not wanted. The potting material should be used in a rougher state for the two last shifts, and a little bone-meal and some small bits of white sandstone introduced, and the whole made firm round the ball. The pots must also be well drained, and not over-watered until the new soil is fairly occupied with roots, as it is apt to get soured before the roots get at it. To prevent this, we use plenty of charcoal mixed with the compost for all classes of plants, and often dress the surface of the pots with the dust with very beneficial results.

When it is desirable to get up a specimen plant in a limited time, it is a good plan to prepare a nice border of rich soil in a warm house or pit, and put out a small pot-plant, where, if all other conditions are favourable, it will grow luxuriantly, and form a handsome specimen in much less time than when grown in pots. When lifting it and potting it, care must be taken not to hurt the roots much, and get as good a ball of earth as possible by digging well round and in below it, and syringing the foliage occasionally after potting. Old plants can also be cut back annually after the flowering period, started into growth again, and when fairly broken the old ball should be reduced and a little fresh soil added. A little liquid manure can be used at intervals to plants in full growth and when flowering, which they generally do towards the autumn and winter months, if subjected to a temperature of 50° to 55° by night, with a rise of 10° or 15° in the daytime. Although this plant is easily grown and flowered in pots, it nevertheless succeeds better and is more at home when planted out and grown as a conservatory shrub, or trained to a wall in a warm greenhouse or intermediate house. In both cases the

border must be made up for it, and the natural soil taken out to the depth of 3 feet, and as much or more all round. If the natural drainage is deficient, begin by putting in a layer of broken bricks, and over them a thin layer of crocks broken small and covered with a few turves, or with some of the roughest parts of the compost, which should be composed of equal parts turfy peat and loam, chopped up with the spade, with about a sixth part of sharp river or silver sand, broken charcoal, and good-sized lumps of sandstone, thoroughly mixed and made firm with the feet, after which put in plants which have been grown on to some size in pots. In planting, carefully remove the crocks from the bottom of the ball, and disentangle the roots all round with a pointed stick, and place the surface of the ball so that it will be a little below the level of the surrounding soil, placing some of the finest mould next to the roots, and make all firm, after which give a slight watering with tepid water to settle the soil about the roots. Future operations will consist of watering, pinching, tying, &c. ; and should greenfly or red-spider put in an appearance, give a thorough syringing on three consecutive evenings with a pretty strong mixture of tepid water and soft-soap.

When treated thus and well established, this *Luculia* forms one of the most effective and valuable of decorative plants, producing large heads of very fragrant flowers through the dull months of autumn and winter.

DUNDONIAN.



WALKS AND FOOTPATHS.

It might not be justifiable to make a distinction between a walk and a footpath as a feature of utility in the garden, still we think there is or ought to be some distinctive difference, in so far as the construction is concerned, between say the walks of a kitchen-garden which have to withstand the wear and tear of traffic, and the footpaths in a pleasure-ground which are made to be comfortably walked on and enjoyed. Some walks must be made to be wear-resisting as well as for comfort ; others for comfort alone. The perfection of a footpath is one made of grassy turf, tough and dry, and closely shaven ; the perfection of a walk is perhaps one made of asphalt, and peppered over with very fine gravel ; but as neither of these pieces of perfection are always practicable, or possible, or even permissible, the best attainable must content us. It is remarkable that human beings, of whatever quality, will decidedly walk on grass in preference to the smoothest and best-kept walks, so that by the side of a frequented walk there will always be found more or less of a footpath running

parallel, unless some obstruction is placed in the way ; and hence also in every public garden her Majesty's subjects are requested to keep off the grass, an injunction repugnant to the inclinations of the said subjects. We prefer also to walk on a Brussels' carpet, rather than on the most brilliantly polished of marble-floors, because of the comfort afforded by the buffer between our feet and the hard floor. It will be remarked that the footpaths or portions of footpaths least avoided are those which are soft and elastic without being wet,—the foot at once responds to the soft comfortable sensation ; but when a hard harsh surface is encountered, the foot instinctively turns to the grass. The formation of parallel footpaths is compelled when the walk is gravelled with a hard material, or where the bottom is hard and rough, even if blended with fine. Voluntary penance is said to be wholesome, but few aspire to it.

In making footpaths and walks, it is not necessary to take the soil out deep, as is often done, and to fill up the space again with rough materials, with the idea of making the path dry ; this is just frustrating in the very worst way the first object that should be aimed at in making a comfortable footpath. A deep bottoming of stones or shingle destroys all elasticity and softness in a footpath, and does not at all add to its dryness. The line of a footpath can be made thoroughly dry, so far as draining can do it, and provision can be made for carrying off the surface water ; but in order to do so, it is not necessary to dig a ditch in the middle of it, and fill in with rubble-stones, but rather to drain one or both sides and leave the middle intact, with just sufficient excavation, say 4 inches, on which to lay a thin coat of fine-sorted gravel, thus preserving as far as possible the elasticity of the soil underneath the gravel. A walk made on the opposite principle remains permanently comparatively harsh and uncomfortable to walk on, and becomes aggravated in very dry weather. A fact not generally recognised is, that over-dryness is exceedingly detrimental to roads and walks as well as over-wet ; and we have found it necessary to water the walks of a pleasure-ground to preserve them from breaking up from excessive treading—just as the water-cart benefits a road on which there is much driving in dry weather. Even in the making of walks, where much traffic is expected, deep excavation should be avoided. Macadam depended not on a large quantity of materials, but on a thin coating carefully laid on after the foundation of the road was built and made thoroughly dry. The most enjoyable footpaths we ever knew were made over bog-soil, well drained, levelled, and just a thin coating of fine river gravel over the surface ; and there seems no reason why bog-soil, where attainable, should not be substituted for harder material for the bottoming of

footpaths: it would be the cocoa-fibre mat of the pleasure-ground. On the modern iron road, the different sensation of the stone sleeper and the wooden one is at once felt; or that of a train passing over Chatmoss, compared with the hard rattle of one passing the rocky neighbourhood of Penrith. We do not wish to discuss the question in detail at present how walks should be made; we only want to show that something imperfect in their construction, or something very wrong with their surface, compels people to take to the grass, and so form the offensive footpath.

The direction which walks and footpaths should take about pleasure-grounds and parks is a question that should be well considered by landscape and other gardeners, in first laying out places; and this, if not attended to, will be a source of irritation ever after. These are often, indeed generally, laid down in an arbitrary sort of way, to complete the symmetry of a plan to be afterwards blotted out or abandoned and another course substituted. The current of humanity is like water, difficult to divert from a natural channel. Footpaths are always an eyesore, especially when they cross fences; indeed nothing seems to impede the course of a human footpath. In this respect the human animal rivals the ant or land-crab: one instance is daily under our notice, where the offensive line of march crosses a grass plot over two iron fences, two walks diagonally, a shrubbery, a plantation, a wall eight feet high with two wires stretched on the top, and finally, a deep fosse or ditch. It is just Suez or Nicaragua on a small scale—the path must be made sooner or later. In thus recognising the footpath as a route for the made walk, we put an end to all stiff formalities in the matter of walk-making and in laying out grounds. A walk must lead to somewhere, and be for some use, and not a mere streak of gravel on which nobody has any desire to travel. It does not necessarily require to go straight—very few bye-paths do—but should rather have a tendency to curve right and left.

If the natural blending of the useful and ornamental were more generally recognised—always giving the useful the first thought—there would be fewer troubles with bye-paths. We could mention almost offhand a dozen lordly places where the dairy and kitchen-garden produce cannot approach the kitchen without crossing under the principal windows, and being carried through the pleasure-grounds, unless a very wide detour is made. In other places the lines of walks are made to join at long acute angles, where the temptation is irresistible to cut across. Carriage-drives which people are expected to follow are made to deviate for some view or effective bit of scenery, and so in the end a bye-path is sure to be made. We could name a dozen places with enormous expanses of sterile gravel walks leading to

nowhere and useless, and where a constant war is waged with bye-paths in the shape of notice-boards, iron hoops, and stumps.

No wonder a taste is growing for the wild garden, the wilderness, and the woods, with cool and natural footpaths made at a fraction of the expense required for acres of hard gravel, and infinitely more enjoyable.

THE SQUIRE'S GARDENER.



HERBACEOUS PÆONIAS.

IN a season like the present, when the general run of bedding-plants are at this date (15th July) no bigger, but in many instances actually smaller, than when they were planted out, certain herbaceous plants come out in splendid contrast to these draggled denizens of warmer climes. A very considerable number of herbaceous plants is to be found in full flower at the present time, bidding defiance to the weather, bad though it be. But the most conspicuous, and certainly the most showy of all in bloom, now nearly a month behind their time, are the Pæonias whose name stands at the head of this paper. These stand unrivalled for effect in the distance; and really, in such weather as we have experienced during this strange blending of spring and winter which has usurped the place of our summer, it becomes a point of some importance to consider and keep in view that flower-garden effects which can be noted and enjoyed under the protection of a roof are just such as only could be enjoyed out of doors by none except the most robust; for who, besides, would dare all the risks of rheumatism or endless colds certain to attend on exposure to the unseasonable weather which has prevailed all over the country for months past? These Pæonias are not only amongst the best plants for distant effects on the margins of masses of shrubs, but they are grand and effective objects when viewed by themselves singly or in masses made up solely of the different sorts that may be drawn together. They take the highest place amongst the grander types of herbaceous flowers. Improved as they have been during recent years, there is a very great variety of beautiful colours, as well as ample form and size and substance, to be obtained by careful selection from the lists of raisers and dealers who make a speciality of them. In the matter of colouring they rival the Rose itself, in so far at least as Hybrid Perpetuals are concerned. Indeed they present some colours, such as white, in greater purity than are to be found in any H.P. Rose; and nearly every other shade of colour presented by that class of Rose is splendidly exhibited in one variety or another of the Pæonia. There is also a very considerable range of duration of the flowering period of the different varieties: some are early, some late, and some are more enduring or persistent than others. Many also are little less fragrant than the Rose itself.

The following varieties are among the best and most distinct in cultivation :—

P. alba sulphurea.—Pure white, the base of the petals sulphur-yellow, very fine double flowers, and a profuse bloomer.

P. Alice de Julvecourt.—Beautifully formed, very double; splendid flowers, with pink guard-petals, the centre ones white, shaded with blush and flaked with crimson.

P. Ambroise Verschaffelt.—Large, brilliant, purple-red flowers, finely formed; a very free bloomer.

P. atrosanguinea.—Splendid bright crimson, flushed with purple; one of the most distinct and showy of the dark-coloured sorts.

P. Augustin Dhour.—Dark purplish-rose, enormous flowers, very double, and fine in form.

P. candidissima.—Pure white, the base of central petals primrose, giving a pale creamy tint to the centre of the flowers; a very effective sort.

P. carnea elegans.—Pink of a delicate tint, changing to white; splendidly-formed large flowers.

P. Dr Bretonneau.—Grand petals, rich satiny rose, central ones bright lustrous pink, edged with a lighter shade of the same colour and white.

P. Etandard du Grand Homme.—Brilliant purple-rose, enormous flowers, of beautiful form, and very double.

P. Francois Ortegat.—A semi-double of very effective character, purplish crimson, with the yellow anthers in centre very conspicuous.

P. globosa.—Guard petals deep pink, centre chamois.

P. Henry Demay.—Bright purplish-crimson, a very double and free-blooming sort.

P. Isabella Karlitzky.—Warm purplish-rose, enormous double flowers of excellent form.

P. Jeanne d'Arc.—Outer petals rosy pink, centre ones white, a very free flower.

P. Leonie.—Delicate peach, finely-formed double flowers.

P. Madame Calot.—Guard-petals white suffused with rose, centre ones pure white, large finely-formed flowers, and an abundant bloomer.

P. Madame Chauney.—Fine satin rose, shading at the edges to lighter rose; a very double, finely-formed flower, and an abundant bloomer.

P. Madame Serret.—Creamy white, flushed with chamois; finely-formed, very double flowers.

P. Marquise de Lory.—Petals pure white, shading into delicate primrose at the base, somewhat flaked with carmine; flowers very large, double, and of fine form.

P. Modeste Guerin.—Outer petals rich purple-rose, centre ones bright deep rose, flowers splendid in size and form; a very free bloomer.

P. Mons. Rousselon.—A very distinct and beautiful variety, with

deep pink outer petals, the inner ones more delicate or paler in colour, flaked with carmine.

P. nivea plenissima.—A very fine pure-white variety, flowers extra large and very double.

P. officinalis rubra-plena.—One of the oldest but yet one of the best in its particular colour, flowers very large, deep crimson, well formed, and early.

P. Rosamond.—Rose-pink, very bright, and shaded to delicate rose on the margin of petals; a very double, free-blooming, fine variety.

P. Souvenir d'Auguste Mieliez.—A very distinct and beautiful variety; one of the most effective and showy; rich crimson-purple, very large flowers, a free and late bloomer, which will help to prolong the season of this useful genus of flower.

P. Souvenir de l'Exposition Universelle.—Very fine, rich, lustrous rosy-pink, tinted on margins of petals with white, flowers very large and double.

P. tenuifolia flore-plena.—This is distinct in every respect from any other *Pæony*. The foliage is deeply and finely cut into elegant filaments; habit dwarf and compact; the flowers very double, medium sized, compact, and handsome, deep crimson or blood-red.

P. Victoria d'Alma.—Very fine, large, double flowers, rich purplish-crimson; a very free bloomer.

P. Whitleji.—A species the blood of which has contributed much to the improvement of the now very numerous varieties. The flowers are single, pure white, with a mass of golden-yellow anthers in the centre, which give a striking and pleasing effect along with the broad white petals. It is remarkable for its fragrance, and is altogether a very desirable border plant.

W. SUTHERLAND.



HARDY FRUITS—SEPTEMBER.

TREES may be expected to form growths very late this season; and where ground is rich and deep, and not very firm, the evil will be increased. The growths should be stopped in a systematic manner, going over first and shortening all the strong sappy shoots: in due time the weaker ones may be topped, and many cut out to let in light and air. The form of the trees should at all times have due consideration; and where there is a weak or thin side, wood should be left accordingly to fill up. Pyramids are more difficult than most other forms to have in proper shape without crowding. The leading shoot may be shortened less than the side ones; they might be left in the proportion of about $1\frac{1}{2}$ foot for leaders and 9 inches for side growth; and when the leaves are off they can be cut to proper forms. Old-established trees require less care in this way; allowing a few shoots to take the place of older ones to be cut out by and by is a good and safe practice. But where growth is going on now as it should have done in June it is well to examine the roots: at one side lift a goodly portion, shortening back gross ones, and those that are going downward should be cut off cleanly. Place healthy brick rubbish below the tree,

ramming it very firm. If the tree should continue to make gross wood after this operation, the other side should be treated in a similar manner. While advising this, we abhor the barbarous method of cutting with a spade round the tree, removing all and sundry roots which come in the way. If any roots are split and peeled, they should be cut clean over. In shallow and sandy soil it may be necessary to mulch after the roots have been lifted. There should be no bending or twisting of roots, otherwise suckers may be started, and they are not easily mastered when from the roots. All suckers should be carefully kept off fruit-trees, cutting them clean to the main roots. Whatever is left undone, as to training in young wood on walls and fences, no time should be lost, so that the autumn sun and air may have full power over the wood; this is particularly applicable to Peaches, Nectarines, Plums, and Apricots. Whatever may be said regarding the dying-off of the latter, and Morello Cherries, we are of opinion that it arises from being obliged to use the knife freely, by absence of space for the trees to develop themselves according to root action, consequently trees do not mature their growth; they start early, and spring frosts paralyse them, and dead limbs are soon plentiful. In the great Apricot districts in Oxfordshire, and elsewhere, excellent Apricots may be seen growing in every aspect, trained to old stables, dwelling-houses, sheds, and piggeries. Seldom are these trees to be found unhealthy, and so far as skill and care are taken with their training and pruning, there is simply none. The roots may be found among solid beds of stones, lime, and brick rubbish. When planting these trees, abundance of old lime rubbish may be rammed in the bottoms of the holes, and a goodly mixture of this added to the soil: the whole should be a solid bottom when the tree is planted. After the trees are planted a year or two, the system of lifting must be skillfully adopted. When the roots are allowed to run into cold wet clay, dying-off branches may be expected. The same principle applies to Gooseberry-bushes; they often die off at their collars. It may be found that in such cases the roots at bottom are starving in cold or very poor soil, while those on the surface are in extra rich soil. They may be lifted and replanted, on ground well trenched, spreading the roots out, evenly covering them with 6 or 8 inches of soil, then carefully mulching them. After this treatment, which may be done in September, or any time between autumn and spring, they will make small wood, and become very fruitful.

Figs should be freely exposed to sun; after such a late season they are not likely to ripen readily; the shoots should be kept into the wall thinly. Too often the object of fruiting is defeated by crowding in thickly luxuriant growths, which never become matured, and consequently bear no fruit worthy of consideration. Raspberries should be thin, and freed from the wood which has supplied fruit, leaving from three to five or six shoots to a stool: they require temporary ties till the proper time of renewing stakes or wires, according to the method of training them. Strawberries may be planted. There are so many ways of being successful with them, one can scarcely add a suggestion; but whatever plan is adopted, good growers admit that thorough trenching and manuring is of primary consideration. Off-sets from old plants may meet a difficulty when runners are scarce. Young plants planted in a triangular form of three together is an old plan, but one not to be despised. Plants which have been forced, and have not been too much neglected, answer every requirement.

In the Orchard-house there will not be a great many fruits left, except the kinds which are kept for special late purposes. Thames Bank Peach, Princess of Wales, and Late Admirable, may not be ripe for some time. Coe's Late

Red and Golden Drop Plums are kept late with other things. Wasps and birds may yet be troublesome : guard against them. Lifting trees planted out to keep them dwarf, pinching, and syringing, require special attention. M. T.



NOTES ON DECORATIVE GREENHOUSE PLANTS.

THE CHINESE PRIMULA.

AMONG the many useful decorative greenhouse plants, the Chinese Primula holds a prominent place ; and it is indispensable among the dwarf section of flowering plants, not only on account of the time of year at which it naturally flowers, but also for its floriferous qualities, and for the long time which it continues in bloom. It is also one of the most useful subjects for room decoration, as it stands such work better than most plants, and is a very suitable plant for the breakfast-table, or for a small dinner-table ; while for conservatory decoration, nothing looks more beautiful than a wire stand filled with the scarlet and white varieties mixed, and a few pots of Lobelia to hang over the edges of the basket.

The Chinese Primula has been wonderfully improved of late years, both as regards colour, size, and substance of flower, some of the strains sold by our leading seedsmen being wonderfully fine.

The Chinese Primula has to be raised entirely from seed ; the time of sowing will depend upon the time when they are wanted to bloom. For autumn and winter flowering the seed should be sown in the beginning of February ; a well-drained pan should be used with some roughish soil over the crocks, two inches of the top being filled with leaf-mould sifted, some peat-soil rubbed through a fine sieve, and a good dash of silver sand added. Have the surface of the soil levelled, and then scatter the seeds thinly ; shake a little of the soil over the seed through a fine sieve, and water through a very fine rose ; then cover the pan with a piece of glass, and set it where there will be a temperature of about 65° kept up : an early vinery suits very well. The young plants are very impatient of too much moisture, so as soon as they are well braided the glass must be tilted up at one side, and the pan set near the light in an airy part of the house. The young plants must be pricked off singly into thumb-pots as soon as they have made two rough leaves, using the same compost with the addition of a small modicum of loam ; set them in a warm pit, and shade slightly for a few days until they get hold of the soil, when shading may be dispensed with. As soon as the pots are moderately well filled with roots, shift into 4-inch pots, using the soil in a somewhat rougher state, and about equal parts of loam, peat, and leaf-mould, and a good quantity of silver sand, to keep all open. The plants may soon require a little support, which may be given by means of three little pieces of sticks thrust into the soil close

to the neck of the plant. They ought always to be grown near the glass, however, and a free circulation of air about them will tend to make them sturdy and independent of support—though, of course, favourable opportunities for giving air must be taken advantage of. After the middle of May they may be inured to a lower temperature, and about the end of June they may be set in a cool pit, or in a cold frame set on a bed of ashes, and liberally aired through the day, but the lights kept on at night. Some of the stronger plants may be shifted into 6-inch pots, which is quite large enough to flower them in, though some shift them into 8-inch pots. Still, as good plants can be grown in the smaller pots, and they are easier managed, some of them should be retained in the smaller pots: they will bloom earlier, and may be suitable where 6-inch pots would prove too large for the purpose. They must be carefully watered after being shifted into the larger pots, and kept somewhat close for a few days, and shaded from bright sunshine, till they take with the shift, after which they may be aired liberally.

The best batch of Primulas we ever grew, and as good as we have ever seen, was grown in a cool pit, set on a shelf against the back wall and close under the ventilation, which was the old system of sliding sashes. The plants thrive amazingly in this situation, and were very sturdy as a matter of course; and the flowers, for size and depth of colour, were the admiration of all who saw them. After the pots are pretty well filled with roots, they will be benefited with an occasional dose of clear soot-water: this makes an excellent manure, and puts a nice healthy green appearance on the foliage such as few other things in the way of liquid manure can accomplish. It is also a safe manure to use, if nothing but the clear water be made use of, after having had the soot steeped for, say, four-and-twenty hours or so. The plants may remain in the cold frame or pit until about the beginning of October, when they should be removed to a warmer situation, say a warm greenhouse. The nights during the month of October get rather raw and cold for them to stand out longer with safety, as the leaves might turn yellow and drop off. A temperature of about 50° will be amply sufficient for them now, however, and about 5° more through the month of November, and onwards during the time they are in flower.

A pinch of seed should also be sown about the beginning of June, proceeding in the same way as described above: the glass which covers the pan may be shaded slightly until the seed vegetates, when the shading should be removed and the glass tilted up. When the young seedlings are ready for potting off, let them be put into small pots; and when they have got established, they may be grown on in a close frame or pit through the summer months, and this will make them nice and hardy, and able to stand over the winter well. They will require to be shifted into larger pots some time during August, and we do not advocate a larger size of pot than 4 or 5 inches for this batch. They will bloom during the spring months, and prove very useful.

These plants will flower again during the autumn, if they are taken care of. Pick all the flower-stems off, and shift them into 6-inch pots, and grow them on in a little heat until June, when they will do in a cool pit or frame, as described above. Though the flowers are never so large as on younger plants, still they may turn in very useful. Where it is considered desirous, from having an extra good strain of plants, or other circumstances, to save one's own seed, a few of the best plants should be set apart for this purpose,—not, as is very often done, to set them aside out of the way and to partial neglect, but setting them aside for special treatment—even better treatment than when grown for flower—keeping them well watered and free from insects, and assisted to form seed by fertilising the blossoms. This can sometimes be done, and is practised by some, by pulling off a few of the flowers gently : as the flowers bring the anthers along with them, and are drawn over the stigma, a portion of the pollen *may* happen to come in contact with them, thus securing fertilisation. However, we consider this a very barbarous mode of procedure, as no doubt all the parts of the flower are intended to perform their part in maturing the seed.

J. G., W.



ORNAMENTAL TREES AND SHRUBS.

COTONEASTER (THE COTONEASTER).

THE genus *Cotoneaster* is composed of a goodly number of hardy evergreen, sub-evergreen, and deciduous low-growing trees and shrubs very diverse in general appearance. They are found distributed over Europe, Asia, and America ; and several of the species have been long cultivated in this country, and are still extensively used in the adornment of our gardens and pleasure-grounds. Few shrubs or trees adapt themselves with greater facility to almost every variety of soil, if dry ; and they are found to thrive in poor, gravelly, or sandy ground where it would be difficult to induce other plants of their character to grow. Though most of the sorts are perfectly hardy, they should always be planted in situations sheltered from the full force of violent winds.

C. frigida (*the frigid Cotoneaster*).—This is a sub-evergreen, or in mild winters and in sheltered localities an evergreen, tree of about 20 feet in height, indigenous to high mountains in Northern Nepal, from whence it was first introduced into this country in 1824. The leaves are of an elliptic form, tipped with a small spine, crenulated, of a dark shiny-green on the upper surface, and lighter below. The branchlets and under sides of the leaves are covered with a minute wool while young. The flowers are pure white, small individually, but being produced very abundantly in terminal panicles, they pro-

duce a fine effect when in full perfection, which is usually early in May. The small bright-crimson berries are ripe in September, and hang on the tree till winter, and sometimes till spring. It is here a vigorous-growing, very hardy tree, and from its fine foliage and showy flowers and fruit, very desirable for planting either in groups or singly in parks, shrubberies, or the margins of woods.

C. affinis (*the allied Cotoneaster*).—So named from its close affinity to *C. frigida*, of which species some writers regard it as merely a variety. It is a sub-evergreen or evergreen tree of from 15 to 20 feet in height, introduced from Chittaong, Nepal, in 1828. The leaves are ovate, tipped with a small spine, bright green above, and woolly beneath. The flowers and fruit are almost identical with the preceding species, appearing about the same time, the berries hanging on the tree, and being very ornamental many months after ripening. It is an exceedingly interesting tree, well worthy of attention on the part of those engaged in decorative planting, its distinct appearance giving quite a character to groups of low-growing trees or tall shrubs.

C. Simonsii (*Simon's Cotoneaster*).—This is a sub-evergreen shrub of from 5 to 8 feet in height, introduced from Khasya, in Nepal, in 1850. The leaves are oblong acute, dark green above, lighter beneath. The flowers are white, appearing in May. They are followed by a plentiful crop of bright-scarlet berries, which ripen in September, and remain on the branches during the greater part of the winter. It is a remarkably hardy, ornamental shrub, certainly one of the most attractive of the genus, in most seasons truly evergreen; and not only effective in the open shrubbery, but very suitable for covering walls or house fronts—its beautiful scarlet berries rivalling in beauty those of the well-known *Pyracantha*. It is also found to make a neat, close garden-hedge, standing the knife well—a purpose for which it might be, with advantage, more extensively used.

C. microphylla (*the small-leaved Cotoneaster*).—This is a prostrate evergreen shrub, with long wiry stems, spreading over many feet when allowed full scope, but seldom rising above 2 or 3 feet. It is a native of Nepal, where it is found on the rocky slopes of mountains. It was introduced in 1824. The leaves are small, oblong, of a thick leathery texture, dark green above, and slightly pubescent beneath. The flowers are white, similar in appearance to those of the Hawthorn; they appear in May or June, and are succeeded with scarlet berries, which ripen in August, and remain on all the winter. Apart from its value for planting as a single specimen on a lawn, where it soon forms a compact, cushion-like specimen, it is one of the most useful of plants for a low wall, the dense, full foliage, twiggy branches,

and bright berries in winter rendering it a very pleasing object. It is, moreover, a valuable rockery plant, and may be introduced with the best effect into any situation where a trailing evergreen shrub is desirable.

C. thymifolia (*the Thyme-leaved Cotoneaster*).—Another prostrate evergreen species from Nepal, from whence it was first sent home by Dr Royle in 1850. The leaves are much smaller than those of microphylla, about $\frac{1}{4}$ of an inch long, obovate-oblong in form, shining dark green above, and silvery white beneath. The flowers are small, pinkish, appearing in May, and followed by bright-crimson berries, ripe in August. This is a very beautiful little shrub, perfectly hardy, and admirably suited for planting on rockeries. It might be utilised as an edging in the flower-garden, as it has all the closeness of habit which renders the dwarf box so useful, with an appearance quite distinct from, and equally handsome with, that well-known plant.

HUGH FRASER.



THE AMATEUR'S GARDEN.

LEEKs, ONIONS, GARLIC, AND OTHER ALLIACEOUS PLANTS.

LEEKs should be well grown or not attempted at all, for nothing is more unsatisfactory than ill-grown Leeks, while well-grown ones are invaluable to the owner of a small garden who wishes to make the most of it. To have them in the best condition possible, the ground to which they are to be finally transplanted should be prepared in winter by deep digging and very liberal manuring. Indeed, if the soil be thin and light, one-third of the whole body should consist of rich cow-manure, and if possible the whole ground should be soaked during frosty weather with cow-urine or other manure-water. The difference between the produce of land so prepared and land prepared in the ordinary way will more than pay for the extra work and expense, and the ground will be left in first-rate condition for Cauliflowers the succeeding season. Very much depends also on the raising of plants early enough, and the warmest position and richest soil should be chosen for the purpose of raising plants on, avoiding the too common error of sowing the seed thickly: thin sowings give by far the finest plants. It is best, if possible, to sow them under protection, such as a cold frame or a hand-light affords. As soon as the stems attain the thickness of an ordinary pencil, they should be transplanted. The usual way adopted by amateurs is to leave them where they are sown, but the produce under that system is very inferior. Supposing ground to have been prepared during winter, as

recommended, it will be advisable to break it up finely six or eight inches deep with a fork, to make it loose and open. In planting, stretch the line where the row is intended to be, and thrust the dibble down to the depth of six or seven inches, and just drop a plant in the hole and leave it there. Do not fill in the hole, or you may put the earth into the centre of the plants, which would spoil them. Enough earth will fall into the hole of its own accord. Allow the plants from a foot to eighteen inches between the rows, and from four to eight inches between the plants in the row, according to the richness of the soil and the strength of the plants. In hot, dry weather, a good soaking of water with a little manure of some kind in it will help them wonderfully; but whether dry or not, manure-water should always be given, as it makes a great difference on the crop. There is nothing to surpass cow-urine for this purpose, well diluted with water, or better, the drainage of the house. Indeed, the last by itself is worth a good deal for the purpose of stimulating this crop, as well as many others. Frequent stirring of the soil by means of a hoe will help them much, and will destroy weeds.

To grow Leeks for exhibition, sow seeds of a favourite strain about the beginning of February (not sooner, or they will run to seed), under glass in a stove, a vinery, hotbed, or other similar place. Grow them on in pots in rich soil, and harden off carefully, finally transplanting them to a rich piece of ground about the end of May, putting them down a foot or so in the soil, and keeping the soil from reaching their centres by means of funnels made of stiff paper, or such like. The stems "draw" to the surface in a week or two, when the funnels may be removed. Floodings of manure-water at intervals are also given, and by such means wonderfully firm Leeks are grown, and fit for exhibition by August.

Onions.—For the earliest supply, sow from the 1st to the 20th of August, according to locality, on moderately rich, firm soil. Some people sow in beds, but we prefer to sow them in a sheltered spot in rows one foot apart, because they are much more easily kept free from weeds when thus sown than when in beds, as the hoe can be worked between the rows, while that is impracticable in beds. Moreover, the stirring late in autumn and during spells of fine weather in winter and spring tends to keep the soil in a dry healthy state, which is of great benefit to the plants. Sow thinly, so that the plants may stand clear of each other after they are up. If they are clear of each other they will not require to be thinned till spring, when the thinnings may be transplanted in rich soil, where they will generally grow to a large size. They can be finally thinned further on in the season, when the thinnings will prove useful in the kitchen. These autumn-

sown Onions do not generally keep so well over winter as the spring-sown ones, and are considered coarser, but they come in before spring-sown ones ; and on some soils where the grub is troublesome, it often happens that the autumn-sown ones are the only Onions which come to perfection. For spring-sown ones the ground should be prepared during winter as advised for Leeks. A rich well-worked soil is necessary to the best results, and on this account many gardeners grow their Onions on the same ground year after year, with better results than they can attain on the rotation principles. The ground, in digging, should be left rough, and levelled with the Dutch-hoe early in spring. We prefer having ours in by the end of February or beginning of March ; but it is better to be guided by the condition of the soil than by any dates. We have found that the crop is materially benefited by a slight dressing of soot and wood-ashes hoed into the surface at sowing time, and it is, at the same time, the best preventive of the maggot that we know of. A dressing of soot after the plants are well up—say in June—should be given for the same purpose, but a showery time should be chosen for this, so that the adhering particles of soot may be washed off the leaves. Sow the seed as advised for those sown in autumn, but make sure that the ground is level before drawing the drills, or the seed will be apt to be raked out when the ground is finished off. Draw the drills about an inch deep, and cover regularly. Should the soil be of a loose sandy nature, a light tread will prove beneficial, otherwise the soil will be made firm enough by the treading necessary when hoeing and levelling the ground, and sowing and covering the seed, &c. A firm heavy soil gives the best results. In thinning them out, give them from two to three inches, unless the crop is likely to be all the finer ; but moderate, well-ripened bulbs keep best, and are generally preferred. In wet seasons or late localities a difficulty will frequently be experienced in getting the bulbs properly matured. The ripening process may be accelerated by going over them by the end of August, and twisting their neck or laying them over. By the middle of September they should be pulled up, and spread in the full sun on a clean dry bottom. A good place is a frame, pit, or other glass structure which contains no plants requiring water, where they can be spread on a dry bottom in the full sun ; but in ordinary seasons they may be matured by hanging them up in the sun in nets, removing them indoors at night. After they are thoroughly dry they should be divested of all husks, &c., and be stored for the winter in some cool, dry place, where they are safe from frost. Turn them occasionally during winter, and remove decaying ones. The best keepers are Blood Red and James's Keeping.

Shallots are often grown in cottage-gardens, and frequently do very well where Onions are of very little use. Prepare the ground as for Onions, and plant in February or early in March, by pressing them into the soil so as to just leave the points out and nothing more. This should be done in drills one inch deep, so that the working of the ground after they are fairly growing will not cause them to be left on a ridge. From one foot to fifteen inches between the rows, and from four to six inches between the sets in the rows, is about the distance they require, according to the condition of the soil and the variety, as there are great differences in the habits of the different kinds. Take up and dry the tubers after the foliage becomes yellow, and store them as advised for Onions. They are also grown from seed treated like Onions. Small Onions, too small for use, may be planted and treated in the same way; and if care be taken to remove the flower-stems as they shoot for seed, the result will be a crop of large Onions. Indeed we have seen Onions sown thickly on poor ground, about the month of May, for the purpose of obtaining large Onions when they could not be secured otherwise.

Garlic requires almost similar treatment to Shallots, and the directions given above will serve for this crop also. The same may be said of Rocambole, which is, however, very seldom grown. For the cultivation of Chives, see the article on Salads in the number of 'The Gardener' for June. These are all the alliaceous plants in general cultivation.

GARDENER.



FRUIT CULTURE.

As it is generally admitted that there are always two sides to a question, I suppose I may crave space to answer the criticism of your correspondent J. S. W., who has given us a rather lengthy discourse on fruit culture, consisting chiefly of short paragraphs upon the practice of distinguished gardeners, which is already matter of horticultural history. The extracts quoted from the 'Gardeners' Chronicle' have certainly emanated from my pen, and they convey generally my candid opinion of certain scribes who, I suspect, do not persevere in the cultivation of certain varieties of fruit, and who, not having succeeded themselves, have the courage to condemn them on theoretical grounds, while inferior kinds are lauded to the skies. This I consider to be the misfortune of these writers—not my fault; although I regret, on personal grounds, that anything that I have written should hurt the tender susceptibilities of your correspondent! I will endeavour to take the points raised by J. S. W. *seriatim*, and I hope to be able to cause him to reflect upon the instability of a usually retentive memory. The question

between us is as to the merits of Black Prince as a forcing Strawberry, and now for the proof which is adduced in support of its merits.

We are informed by J. S. W. that he has sold Black Prince in the month of April, in Manchester, at twenty-five shillings a pound, but observe he does not say what time in the month of April, nor is there any account of the weight of fruit gathered from any given number of plants! All we know is, that J. S. W. received twenty-five shillings for a pound of Strawberries some time or other in some month of April, and we are asked to accept this statement unsupported by a tittle of other evidence of any practical value as a favourable recommendation of Black Prince! This proof need only be touched by the finger of sound reasoning, and, like other bubbles, it evaporates quickly into thin air. I have been offered two guineas for a pound of Strawberries in the month of April, and could have had any price that I liked at other times, had I been selling our fruit, for Strawberries for wedding-breakfasts, and other such occasions; and I daresay J. S. W. could have had the same if there were a famine in the market. But we will assume for sake of argument that Black Prince would bring the same price per pound—which we know it would not—as Duc de Malakoff or Underhill's Sir Harry. Who that knows the size and quantity of fruit that the two latter will produce would ever think of forcing Black Prince, when three times the weight of fruit, four times the size, and of far superior appearance, may be had from the same space? Just fancy J. S. W.'s Black Prince staged alongside such pots of fruit of the kinds I have mentioned, as I have seen time upon time, and there is an end of the poor Prince for the present generation. Shakespeare says—

“Let's teach ourselves that honourable stop,
Not to outsport discretion.”

The next point we have to discuss is the merit of Sir Charles Napier as a forcing and dessert variety, and here I must borrow a leaf out of J. S. W.'s book, and quote a short extract from 'The Garden' of May 24th of the present year, at page 420, where J. S. W. describes Sir Charles as being a second or third rate kind, of vigorous constitution. Now the actual fact is just the reverse, and I regard this extraordinary statement as the most cogent and conclusive evidence that your correspondent is debating upon purely theoretical grounds with regard to this particular variety. Sir Charles Napier is one of the most tender Strawberries grown, notwithstanding that it is a prolific bearer under good cultivation.

It was the only variety under my charge last winter that required extra protection from the severity of the weather, and it was the only variety out of doors that was killed to the ground, although it was planted on a sloping dry bank of light well-drained soil, and this has been my experience of it for seven years. It is also a difficult variety to force well: the ordinary conditions applied in Strawberry forcing

would ruin it in a week. I am of course writing of superior cultivation in pots, which does not by any means embrace the common run of everyday practice, where people are thankful for a few mediocre fruits, and write about them with as much apparent sincerity as if they were of first-rate quality and finish.

I have now to pass on to the most amusing part of our subject, where J. S. W. says I have nothing to show for the practice I advocate. Well, perhaps not, but we will see by-and-by. Your correspondent says he has seen our best effort in Strawberry forcing, and while admitting that it was good, still it was no better than our neighbours', and certainly not so fine as many examples he has seen by other growers. This piece of information evidently refers to the fruit exhibited last year at Leeds, and I have no reason to complain of my success at Leeds. I had two dishes of Strawberries there, one of which, "a seedling," was "highly commended" by the judges, of whom one, upon his own account, is an authority on Strawberries.

I intend sending this seedling out by-and-by, and I hope J. S. W. will be pleased to accept a few runners as a memento of my visit to Leeds. The "curious" part of the business is, however, that my first-prize dish was Sir Charles Napier—by the way a "third-rate kind"—and J. S. W. was one of the judges. Now, according to J. S. W., the variety in the first place is a "third-rate kind," and in the next it is said to be "not so good" as other examples, and yet it is good enough to win the first prize by the very person who seeks to condemn it.

The winning dish was set side by side with British Queen, President, Sir Joseph Paxton, and Vicomtesse de Thury; and a few weeks previously I gained first prize for the same variety at Manchester in company with four different kinds, including President and Vicomtesse de Thury,—so it is evident that Sir Charles Napier is not such a bad thing, when well done, after all. I may also add, that Sir Charles was grown by special request of my late employer, for most of the principal parties during the London season, which, I suppose, may be taken as a little additional proof of its merit as a dessert fruit.

All the forced Strawberries at Otterspool were grown as if for exhibition during my time, but whether upon this solitary occasion J. S. W. saw our best effort is not for me to say—only my experience was, that the very hot weather of 1878 in the month of June was very trying, and was not the most favourable time for Strawberry forcing.

With respect to my mode of taking runners, I find J. S. W. has mixed things up in a bewildering fashion, and I will therefore detail my own practice in a few brief words, and give my reasons at the same time. I suppose it will be admitted that no labour is lost that tends to high cultivation in any department of horticulture; and if this be so, the object of taking runners for forcing from young plants

will be manifest to all good cultivators. At present we have a large stock of runners in small pots ; the best are potted up for forcing, and the next best are planted out in the open quarters for fruiting next year, the remainder being retained for supplying runners for next year's stock to be grown in pots. The short time their roots are confined in the small pots causes them to form a fine plump crown, and they consequently yield a good supply of extra large fruit the following year. That portion of the stock which is intended for supplying runners is planted in two zig-zag lines along the front of any spare border which has been enriched with good soil and manure ; and these plants, for the same reason above given, produce early runners the following season. The advantages are twofold, and in a season like the present, in late localities especially, cannot be overestimated, on account of their furnishing runners so much earlier than old plants. The runners, too, are of the finest description, being fully exposed to sun and air from the start, and are never drawn up, as they are when taken from between rows of old plants.

The crops of fruit are not trampled upon by those who layer the runners ; and I find that a couple of smart youths can lay more runners in one day, when the plants are conveniently situated, than they could otherwise do in three.

The only extra labour involved in this work is that the plants are put into small pots, instead of being planted out later in the autumn, and the result is a fine crop of fruit in the one case, and a crop of healthy young plants for forcing purposes in the other.

J. S. W. says I have nothing to show for my labour, while I think it would be a waste of time for me to draw a comparison between a mere written assertion and the results of my practice, which I cannot for obvious reasons further refer to. There is mere assumption against well-known hard facts.

We now come to the Vine question, and I find J. S. W. assumes a more confident tone on the question of Vine leaves. It is curious—indeed amusing—to follow the freaks of your erratic correspondent in his horticultural controversies. Not long ago I was “called over the coals” for attributing to Mr W. Thomson a system of raising Vines from eyes, of which J. S. W. claims to be the author ; but immediately the chill wind of adversity blows across his path, we find him, as if by instinct, wending his way back to Dalkeith for an example of Vine-growing to fling in the face of his opponent. I believe most people will admit that Mr William Thomson has grown and can grow Grapes. I have no hesitation in conceding that point. I have also had the pleasure of knowing Mr Rose personally, and of seeing his Grapes growing when he was in the heyday of his glory at Floors. I have further had the opportunity of hearing lectures from Mr Rose on the subject of Vine-growing and Vegetable physiology generally ; but I fail to see the relevancy of these illustrations. Have I

disputed that Vines should be in a thoroughly healthy condition of leaf to produce good Grapes? I think not.

The point in dispute was raised in the following way: I observed by reading in the horticultural press that J. S. W. had sent some large Vine leaves to London, to be inspected as a proof of extraordinary Vine-growing. I thought this illustration one-sided altogether, and so I wrote an article to 'The Gardener,' condemning the practice of sending leaves without the fruit attached as being a proof of superior cultivation.

I daresay J. S. W., and perhaps others, may think that I am contesting this point for the sake of argument; but such is not the case, for I am so struck with the condition of some of the Vines here, that I am thinking (notwithstanding the distance) of sending a sample of wood and leaves to the Editor, so that he may express his opinion upon them. The wood and leaves are extraordinary, considering the state of the roots, and prove conclusively to my mind that many of our preconceived notions with regard to fruit culture will not, at all events in all cases, stand good.

J. S. W. admits that there are cases in which big leaves may not indicate good crops. Then where is the use of sending leaves that are not accompanied by fruit? J. S. W.'s motto is, Get good foliage,—the larger the better, if matured. Observe, if matured! The point I contest is, the wisdom of growing leaves as big as J. S. W. would seem to recommend in our dull climate. I am challenged to furnish a single example of a crop of well-finished Grapes that were not accompanied by good foliage of proportionately large size. I gladly accept that challenge, but it must be distinctly understood that my idea of good foliage does not tally with that of J. S. W. I can honestly aver that the grand crops of Grapes—prize Grapes—grown by Mr Junnington of Calderstone Gardens, near Liverpool, Mr Mease of Wyncotte, and Mr Roberts of the same neighbourhood, and many others, of which those grown at Manor House, Cloughton, Birkenhead, and the Garston Vineyard, are notable examples. In all these cases the foliage was clean, well-developed, and thick to the feel—or leathery, as the common phrase goes—but in no case were the dimensions of the leaves equal to that described by J. S. W. in the columns of 'The Garden.'

At the great fruit-show held in Pomona Gardens, Manchester, about four or five years ago, in the class for eight varieties of Grapes, the competition between Mr Upjohn of Worsley and Mr Hunter of Lambton was so close, that there was some difference of opinion as to which should have been the winning collection, but ultimately Mr Upjohn's "fine finish" carried the day, notwithstanding the larger bunches exhibited by Mr Hunter. The finest bunches of Gros Colman I have ever seen exhibited on any table in England were shown at Liverpool, I think in 1873 or 1874, by Mr Upjohn, and the vines at Worsley do not carry those Brobdignagian leaves that we are told of by J. S. W.

I may be wrong in my opinion, but I have the courage to entertain it, that the Grapes from moderate growth of wood and leaf will always carry the sway in point of quality ; while the notable characteristics of J. S. W.'s cultivation will be, generally speaking, big loose bunches, behind the day in everything except weight. I understand that the grand exhibition of Grapes made by Mr Hunter of Lambton, at Manchester, in 1873, as well as on other occasions, was the produce of Vines with exceptionally small foliage compared to the bunches.

W. HINDS.



A NOTE ON PELARGONIUMS.

THE day of the Pelargonium is again coming round. Though it has always obtained a place in gardens, yet full justice has been done to its requirements only in rare instances ; but during these last few years the London market-growers have taken the plant in hand to some purpose, have produced a new break or strain quite distinct from either the "show" or "fancy" sections, and to which the distinctive appellation of "decorative" has been given. I have not been so much taken with anything in the way of "novelties" for some time as I was this season with plants of these. These consisted of specimens between 4 and 5 feet in circumference, naturally grown bushy, and one mass of developed trusses and trusses yet to open. The pots were between 4 and 5 inches in diameter. The best of the sorts were Duchess of Bedford, Maid of Kent, and Mermerus. The raiser of these has other kinds, of which stock is being propagated, said to be improvements on these. It is not difficult to foresee in a few years that this class of Pelargoniums will hold one of the highest places as summer decorative plants. But meanwhile the older and universally known "show" kinds have undergone great improvements of late years—the better form, size, and colour of flower in these having the advantage of this newer section. These can be successfully cultivated in small pots also—in fact it is *the* way to grow them, year-old plants in 5-inch pots, properly grown, making flowering specimens from 12 to 18 inches across. A few of the best of these are Lord of the Isles, Duke of Connaught, Sappho, Ambassador, Gipsy, Blue Boy, Victor, Christabel, Falcon, Warrior.

As a guide to those who may wish to grow these in the way above pointed out, we will add a few directions. Side growths are taken off through the summer, say in July, at which period of the year there is not the slightest difficulty in striking plants. Where a good number is grown, a frame might with advantage be

prepared for the reception of the cuttings, dibbling them in not over closely, and keeping the lights on and shaded from sun for a few days; afterwards the sashes may be dispensed with, and the plants allowed to make a good start before potting them up. The compost should be a rich one, say three parts strong loam to one part of dry cow-dung, with a sprinkling of bone-dust and sand added. The plants may be put into their blooming-pots at once, making the drainage sure, and potting firmly. The plants will do well out of doors until October, when a place near the glass, in a structure where they will be kept gently growing throughout the winter, will suit them best. When the pots get filled with roots, manure-water will be required at every time of watering, otherwise the plants will get stunted and stop growing. As spring advances, air will require to be freely given until the plants are opening their flowers, when they are taken to the show-house or conservatory. We have grown *Pelargoniums* in small pots for years, and can vouch for the success of the system. Everything, of course, depends on the unceasing care bestowed on the plants throughout the year, for the insuring of complete success.

R. P. B.



HEATING BY HOT WATER.

ALLOW me to make a few more remarks on this question, and I am done with it, as I think the matter may now be safely left in the hands of Mr Hammond and his opponents. This I shall do as briefly as possible, making note of only a few extracts taken at random. These are partly side issues, it is true—still we cannot arrive at any just conclusion without considering some of these to a certain extent at least. It will not do to dogmatise on such a matter without showing our reasons for and against the several points raised. Mr Hammond says it is unnecessary to have the flow-pipe on an ascent throughout its whole length, and he is corroborated by several correspondents from apparatus in actual use. The facts, as placed before us in these papers, are worth more than any amount of theoretical rules, some of which, *in actual practice*, are almost worthless as evidence.

At p. 325 C. M. says, in answer to Mr Hammond: “The difference of the specific gravity of the two volumes of water is the consequent result of expansion, which must be the primary cause.” Is heat not the primary cause, of which expansion is the *consequent* result? This may appear a quibble, but there is a point in it.

At p. 328 Albion proves the efficiency of the system advocated by

Mr Hammond, as does also Mr Hiscocks in his first letter, together with A. H., p. 269, and these results are given by apparatus in actual use. In Albion's case (of which an apparatus on the same principle I once had charge of, and a better working one could not be), *practically speaking*, we have no flow-pipe beyond the expansion box.

At p. 375 Mr Makenzie says: "It makes no difference where the highest point is," and thereby coincides with Mr Hammond. But is there no waste of motive power in an apparatus fitted on a long slow gradient, with a gradually decreasing temperature in the body of water, and consequently an increasing *density* as compared with one where the rise is vertical? And is the friction in both cases the same?

At p. 374 he says: "By increasing the quantity (of piping) the friction increases in greater proportion than the power;" and at p. 376, "that the pressure depends on depth or height and the *density* of the liquid, so that it makes no difference to the motive power, seeing the friction in both cases *must* be the same." I draw attention to these quotations for this reason, that we are discussing a question of *hot* water flowing in an apparatus fitted up on a certain principle, which is quite a different thing from a body of water of the same temperature throughout, and being raised to a certain height by pressure or gravitation. I shall trespass no further on your space, but will be content to leave the matter to those who have better opportunities of carrying it to a successful issue, by proving it unnecessary to have flow-pipes for hot water on a continuous ascent.

ROBT. STEVENS.

PASTON, NORTHUMBERLAND.

On p. 373, owing, no doubt, to the indistinct writing, "Torricelliana" appears for Torricelli *and*. On p. 375 I find that it was overlooked, in copying the original MS., to alter the words "every pump and chimney in the country proves," which should have been "every suction-pump in the country proves." Again, on p. 377, for "Deschand's Natural Philosophy," read Deschanel's Natural Philosophy; and for " $\frac{1}{95}$, that of copper-ore, 9.44," read $\frac{1}{95}$ that of copper, or 9.44.

I have no right to object to your having expunged some irrelevant matter, the communication was far too long; but at one particular place this has led to an appearance of confusion, which I shall be obliged by your allowing me to explain. At p. 374, after the words

“electric spark,” appear, “I have no doubt they will.” The complete sentence was: “This may appear to some to be curious reasoning; but all such people I refer to Mr Hammond’s letter in your May number in reply to Mr Inglis, and as he proves his position, while others only assert, I have no doubt they will be satisfied.” The words as printed have no meaning apart from the context, while the completed sentence explains itself.

A. D. MAKENZIE.

2 GROVE TERRACE, *July 28, 1879.*

In your July issue your correspondent “C. M.” says: “It is a well-known fact that a house situated above the level of the others is the hottest, from its having a quicker circulation.” If he will call upon us we will show him an exception to this rule. We have here about 8500 feet of 4-inch pipes attached to two twin Climax boilers, which, according to the statement of the makers, Messrs Barr & Sugden, are capable of heating 2200 feet more pipes than are attached to them, so we may safely conclude they are capable of doing their present quota of work with ease. The mains, flows, and returns, which conduct heated water to our houses, have a direct run of about 326 feet, with a gradual rise from lowest to highest point of 13 feet. The principal of the firm of Horticultural engineers who laid these mains, examined the ground before beginning the work, and declared the local conditions admirably adapted to a rapid circulation and a successful termination of his labours. The work in its various stages was superintended by no less than three practical hot-water engineers—an accumulation of engineering skill which should have placed us in possession of a favourable example of what one of your correspondents is pleased to term the “old system of heating.” We do not know of a 9-foot length of flow-pipe in our houses which has not at least $\frac{1}{4}$ -inch rise in its length, and of course the returns have precisely the same descent to the mains. Every flow-pipe leading from the mains to each of our houses is supplied with a valve so that the heat may be entirely under control.

It was implicitly believed, beyond all shadow of doubt, that the pipes situated on the highest level, taken from the boiler, would be so much the hottest, that valves were put on the mains at about 164 feet from the boilers, in order to check the expected natural inclination of the heated water to rush to the highest point, and so neglect the houses on the lower levels,—so much for theory. The actual results are directly opposed to the engineers, and, at the time, our own “rule of thumb” ideas of the natural laws governing the circulation of hot water. All the houses situated on the lowest level are the hottest, so much so as to require the greatest nicety in managing the valves, which have to be so nearly shut as to almost stop circulation altogether. The houses, situated on what we may term the

middle level, are the most satisfactory, requiring little trouble in the management of valves, and are all that we could desire with somewhat slow fires ; but beyond the valves in the mains mentioned above, which, by the way, are always open, we have a house 86 feet long, and a range 150 feet long, divided into three compartments. The pipes in the first of these, beginning at the end nearest the boilers, cannot be heated to the same temperature as the houses immediately below them. The second compartment is cooler still ; and to show the difference between the first and third, we may say that during last winter, when the heat in the former was above 40° , the frost was in the latter, which is the highest point to which the water flows from the boilers, and to which it has a direct, straight, and uninterrupted run. We may add that all our houses are well supplied with pipes, having been put up for forcing Pines and Cucumbers.

The position of affairs stated above is exceedingly annoying. If we increase our fires in order to obtain the required heat in the highest houses, those on the lowest levels are literally roasting. Surely there must be something theoretically wrong here. Either the engineering skill brought to bear in their arrangement was sorely deficient, or there are exceptionable cases in nature's irresistible laws ; for we are unfortunately in possession of an instance in which hot water persistently refuses to run freely up-hill according to the rules and regulations laid down by the most scientific hot-water engineers, and we do not think any amount of figures or elaborate calculations would have much effect in inducing the water to alter its ways.

JOSEPH HAMILTON & SON.

WELLINGTON PLACE, CARLISLE.

In the May issue I suggested that it would be well, if the discussion on heating by hot-water continued, to provide 'The Gardener' with a safety-valve ; and I hoped Mr Makenzie would have supplied one on the "strata" principle. As yet he has not done so ; neither has he, in his last paper, alluded to a stratum of any kind, hot, cold, or of average temperature ; and I begin to fear that the "strata" theory of circulation has exploded, and that of average temperature sunk to zero.

I am glad, however, judging from the length of his last paper, to observe that he has not suffered any bodily injury through the occurrence, and the strata valve may yet take a place as an auxiliary in the mercurial barometrical chimney-pump theory of circulation, as propounded by him in 'The Gardener' for August.

I do not think the average-temperature point worth warming up again ; but I know Mr Makenzie will pardon me if I again ask him, Does the upper and hotter stratum travel faster than the under and colder stratum on the down-hill journey ? and if not, why not ?

Mr Makenzie says he has refuted my statements, and that I am "wrong fundamentally on almost every point." I have no doubt he

thinks so ; but I would hint, that possibly he is the only intelligent reader of 'The Gardener' who holds this opinion. From the first I contended that the highest point of the apparatus should be as near the boiler as possible, and not as far from the boiler as it can be got, as is the usual practice. Mr Makenzie now says it makes no difference where the highest point is—*not a shade* of a difference. Is this proving that I am "wrong fundamentally on almost every point"? In my humble opinion, it is granting what I contended for. I would also point out that if it makes "*not a shade* of a difference" where the highest point is, then, as sure "as one and three make four"—whether two and two does or does not—there is no necessity "in ninety-nine out of every hundred cases" for sinking the bottom of the boiler more than one foot below the floor-level on which the pipes are fixed. And therefore those "unmitigated nuisances," deep stock-holes, need no longer exist.

I would remark, however, that it makes all the difference, so far as the rapidity of the circulation is concerned, at what point of the apparatus the water attains to the highest point of elevation. If we want the most perfect circulation attainable in any form of the apparatus, the water must ascend vertically from the point on which the fire acts to the highest point. I could tell Mr Makenzie how to prove the truth of this statement, but I will save space in 'The Gardener' by giving a quotation or two from one of Mr Makenzie's favourite authors, which will perhaps be more satisfactory proof to Mr Makenzie that I am right than anything I could advance in the same direction.

Hood, on warming buildings by hot water, page 45, says : "It has occasionally occurred that the circulation of the water in the apparatus has been reversed, the hot water passing along what should be the return-pipe, and the colder water following the course of the flow-pipe. This effect has sometimes been exceedingly puzzling ; but it will be found to arise in those apparatus which have but small motive power, and in which the principle has not been followed out of making the water rise to the highest point of the apparatus *as soon as possible*, and allowing it, *in its return to the boiler*, to give out its heat to the various pipes, coils, or other distributing surfaces which it is intended to heat." Again, at page 169, Hood says : "In all cases where pipes are placed at various elevations above the boiler, for the purpose of warming different floors of a building, or where, from any other cause, the pipes descend by steps or gradations from a high to a lower elevation before the water returns to the boiler, it is desirable that the water should be made to ascend *at once* from the boiler to the highest elevation. By this means the best possible circulation is always insured." I hope these quotations will satisfy Mr Makenzie that it makes "a shade of a difference" to the circulation at what point of the apparatus the greatest elevation occurs. Mr Makenzie says he "will show that increasing the *vertical height* and increasing the *difference* between the temperature of

the two columns acts exactly in the same manner." Increased height gives increased pressure on the bottom and sides of the boiler, and all other parts of the apparatus. But pressure has no more to do with causing circulation as it takes place in the hot-water apparatus, than Mr Makenzie or I have to do with causing the magnetic needle to point northwards. If the water escaped at any point of the apparatus, then the higher the supply above the outlet the more rapid would be the efflux; but the water does not escape at any point of the apparatus,—it *circulates* therein; and unless there is a difference between the specific gravity of the water in the two columns—no matter what may be the vertical height of the latter above the boiler—circulation will not take place,—which is a plain proof that the only motive power at work in the hot-water apparatus is the difference of the specific gravity of the water at different points of the apparatus; and the only way by which this motive power can be increased is by increasing the difference between the temperature of the water as it leaves the boiler at the highest point, and returns thereto at the lowest point of the apparatus. A second time Mr Makenzie says he will show "that increasing the difference of the temperature between the water as it leaves the boiler and in the returning column acts exactly in the same manner as increasing the height." But in place of showing this he gives a long list of isolated quotations from other men's writings; and as proof for or against anything, isolated quotations are of very little value. I would here ask Mr Makenzie if he thinks that the authors whom he has quoted have reached the acme of perfection in their theoretical reasoning on the question of heating by means of hot water, and that no further inquiry on the subject is necessary? If he thinks so, I don't think so; and that I am right the number of unsatisfactory heating hot-water apparatuses that are at work in every county in the kingdom is a proof.

I now come to notice where Mr Makenzie says that my way of increasing the motive power "is a most improper way, for two considerations. First, the quantity of piping must be settled by consideration apart from the circulation; and second, because by increasing the quantity the friction increases in greater proportion than the power, consequently increasing the amount of pipe past a certain point will prevent circulation altogether." Now in reference to the first consideration, why my way of increasing the motive power is "a most improper way," I would ask Mr Makenzie, why must the question of circulation be left out of consideration when deciding the quantity of piping requisite to heat a range of plant-houses? If the quantity to do so "*must* be settled by consideration apart from circulation," then according to the second consideration the quantity of piping might be such as would "prevent circulation altogether."

The question of circulation should be the first consideration. If the

water circulates properly through the apparatus, minor difficulties in connection with its erection are easily got over. Now with regard to the second consideration. It becomes important when considered in connection with another statement of Mr Makenzie's. The second consideration 'says—"by increasing the quantity" (of piping) "the friction increases in a greater proportion than the power." The statement referred to is a quotation from Ganot's Physics, and the conclusions that Mr Makenzie draws therefrom, and reads as follows : "The pressure exerted by a liquid in virtue of its weight (or gravity) on any portion of the liquid, or on the sides of the vessel in which it is contained, depends on the *depth* and *density* of the liquid, but is independent of the *shape* of the vessel and of the quantity of the liquid." This quotation, Mr Makenzie says, "proves that the expenditure of power is the same in raising water by pressure in a vertical direction as at an angle ;" and that it also proves what he proved already, "that the pressure depends on the depth or height and the density of the liquid, so that it makes no difference to the motive power, seeing the friction in both cases must be the same." Now according to this consideration the motive power is limited in its action by *friction*. According to the statement, the same amount of motive power that would cause circulation in apparatus of, say, 500 feet of piping with the highest elevation—say, 5 feet immediately above the point on which the fire acts—would cause as good a circulation in an apparatus of, say, 5000 feet of piping having the same elevation attained by a slow gradient, but situated 500 feet from the point on which the fire acts. Let it be observed that "the height is the same," and the motive power the same in the two apparatuses here indicated. But surely the heated volumes of water will meet with more friction in attaining 5 feet of elevation by travelling up a slow gradient of 500 feet in length, than it would meet with by ascending vertically to the same height. The motive power that is the immediate cause of the water circulating in the hot-water apparatus, and the power that is the cause of water finding its levels by gravitation or pressure, are totally different. The power (heat) which is the immediate cause of circulation in the hot-water apparatus is an imparted power. The power by which water rises to a common level in a pipe or pipes is inherent in the water itself. In the heating apparatus the water receives the power to ascend at one point, while at all other points of the apparatus it is parting with that power, and increasing its power to descend. Hence the heated volumes of water should reach the highest point of the apparatus before they part with any of the power by which they reached that point. Now about "10 or 100 miles" of piping being sufficient to drive the water through the apparatus at a speed only equalled by the electric spark. I have to say that Mr Makenzie must know—unless, like that other engineer,

“he knows very little of what he is talking about”—that the difference of the specific gravity of the water as it leaves the boiler and returns thereto is limited. At a temperature of $39\frac{1}{2}^{\circ}$ water attains its greatest specific gravity, and its least at 212° . These temperatures represent the greatest difference that can occur in the specific gravity of water, and therefore increasing the surface of piping beyond what would be sufficient to cool the water from 212° to $39\frac{1}{2}^{\circ}$ would in no way increase the motive power. On the other hand, if the rate at which the water moves in the pipes is determined by the difference in elevation between the highest and lowest points in the apparatus, then the water could be made to circulate at almost lightning speed: we could have stock-holes any depth.

I now notice where Mr Makenzie tells us “that a lighter fluid, bulk for bulk, can force a heavier uphill, every mercurial barometer, every pump and chimney in the country, proves.” I would ask Mr Makenzie as a special favour to explain in what way does the mercurial barometer show “that a lighter fluid, bulk for bulk, can force a heavier uphill.” In one of the tubes of the barometer there is a vacuum at the top. In the hot water there is no vacuum at any point. The feed-cistern prevents that. Then how does the action of the common pump illustrate “that a lighter fluid, bulk for bulk, can force a heavier uphill”? When raising water by means of the common pump, the atmospheric pressure is withdrawn from one end of the tube, while it acts with its normal force at the other. Nothing analogous to this occurs in causing the water to circulate in the hot-water apparatus.

Now about the chimney illustration, “that a lighter fluid, bulk for bulk, can force a heavier uphill.” The heavier fluid in most cases stands aside and permits its lighter brother to pass upwards. Sometimes, however, the heavier fluid refuses to stand aside, the consequence being a smoky room. I have now only to say that, as requested by Mr Makenzie in ‘The Gardener’ for August, I will undertake to heat a range of houses as indicated by him without sinking the *bottom* of the boiler more than one foot below the floor-level on which the pipes are laid. And further, that the apparatus will work *as well* with the boiler at this level as if the *top* of the boiler was sunk below the floor-level. The question of whether the apparatus works as well the one way as the other I would leave to the decision of the Editor of ‘The Gardener’ and Mr A. D. Makenzie.

J. HAMMOND.

BRAYTON HALL, Aug. 12, 1879.



THE GARDENER'S PRIMER.

NO. V.

THIS power of decomposing carbon dioxide (carbonic acid), and of decomposing ammonia into hydrogen and nitrogen, and water into hydrogen and oxygen, and of recombining, solidifying, and utilising these elements in their structure, is possessed by all plants containing chlorophyll in their *leaves* and in the lower forms of plant-life, as *Paranema* in their free cells. The cells by which plants absorb oxygen and disengage carbon dioxide are not cells containing chlorophyll.

The results of the recent investigations of Mr H. C. Sorby of Sheffield, tend to show that the colouring matter in the green leaves of plants are not simple green-coloured granules, but mixtures of chlorophyll and other colouring substances in a free state, differing in plants, and having different chemical reactions, requiring new names, as chlorophyll, blue and yellow chlorophyll, xanthophyll, orange and yellow xanthophyll, lichnoxanthine, and orange lichnoxanthine, &c.; and that the word endochrome would be a better word to use than chlorophyll as a general term. Further researches in this branch of science, called comparative vegetable chromatology, may tend to explain the causes of many of our beautiful autumnal tints, and of the presence of the colouring substances in the petals of the corolla.

It has been stated, generally, that plants with chlorophyll in their leaves have the power of decomposing and recombining the elements carbon, hydrogen, oxygen, and nitrogen into various states or compounds, but it is not correct to suppose that they are all equally endowed with the extraordinary powers of recombining and rearranging some or other of these elements into all of the following compounds. It will be easily seen, from the names of some of them in the third division, that they are confined to certain plants, and not possessed by other plants. The following are the compounds alluded to: Firstly, compounds of the elements, carbon, hydrogen, and oxygen, generally called ternary, sometimes carbonaceous compounds, or carbo-hydrates, and to these elements the plant is indebted for its cellulose (the basis of all vegetable tissue), starch, dextrine, sugar, and fixed oils; secondly, compounds of the elements, carbon, hydrogen, oxygen, and nitrogen, generally called quaternary, sometimes nitrogenous compounds, and to these elements the plant is indebted for its albumen, fibrine, diastase, and caseine; and thirdly, to all the four elements above named the plant is indebted for its acids, such as citric, acetic, tartaric, malic, tannic, hydrocyanic, oxalic, and gallic acids; and for its alkaloids, such as aconitine, atropine, quinine, morphine, strychnine, theine, or caffeine; and for its volatile oils, resins

(copal); and for the hydro-carbons, caoutchouc and gutta-percha. It may be here mentioned that the milky secretions of our common wild-flowers, such as of the Dent de lion or Dandelion, Sow thistle, (*Sonchus crispus*), Spurges (*Euphorbia*), or Celandine (*Chelidonium majus*), may be regarded as caoutchouc.

Leaves, by exhalation or transpiration, give off in vapour the water of the sap: sun-heat and wind are both causes of this natural process, and a fresh supply of water will be necessary to restore the equilibrium; but it does not go on so rapidly during dull quiet days, and the gardener therefore does not then water his plants so freely as might be otherwise necessary to do after they have been exhausted by sun-heat, nor does he water his plants during sun-heat, nor in windy weather, as it would only tend to increase the exhalation or transpiration, which, when excessive, carries off so much heat from the plant. It has been said that one of the uses of garden-walls is to keep off the wind, and so lessen the exhalation of plants. Du Breuil says that watering fruit-trees growing in the open air, except during their first year of planting, does more harm than good, and to stone fruit-trees is destructive to their roots.

Some tuberous-rooted plants may be propagated by their leaves without buds on them, as Gloxinia gesnera, tuberous Begonia, and many succulent plants. The process by which this is induced is very simple, its direct cause more difficult to explain. The leaf is detached from its parent plant, placed flat on the surface of a pot containing silver-sand, and the veins are cut or broken, and an artificial node or axil is produced; the leaf is pegged down, or kept down in its place, and with the usual appliances of heat, warmth, moisture, and a bell-glass over it, it soon emits roots which will form small bulbs, even at the edges of the leaf, and the green fleshy part of the leaf will perish.

Leaf-buds consisting of wrapped-up leaves are formed, in temperate and cold climates, at the end of the stem or branch, in the autumn, or in the axils on the stem, where the leaves or leaf-stalks are situate;* the mode or plan on which the bud is formed is called "vernation." These buds or eyes, as they are called, can be easily cut out from the stem of a plant, such as the Vine, and be induced to grow in warmth; or they can be cut out from one tree and placed in the stem of another tree when the sap is flowing—and to this faculty is due the practice of budding fruit-trees, as well as Rose-trees on the Briar, and which will to some extent supersede the old system of grafting.

* Trees and shrubs in hot climates do not produce buds; the interval between the formation and evolution of the bud is so short as not to need this protection for the shoot.

ABUTILON BOULE DE NEIGE.

THIS is a most valuable free-flowering plant, producing its beautiful white flowers in great profusion the whole year through. It is a most useful plant for florists, &c., who have a demand for white flowers for making wreaths, &c., although some dislike the shape of the flower, and find fault with the yellow centre for such a purpose; but this can be partly remedied by carefully replacing the petals with the finger and thumb, or giving them a gentle blow with the mouth, and then cutting out the yellow centre with a pair of sharp scissors. This alters the look of the flower entirely.

To have it in flower the whole year through, it is better to have two sets of plants; and June is a good time to strike a few cuttings to be grown on for winter blooming. Take the growing points and dress them in the usual way, and insert them in the propagating-pit or in pots, and plunge them in a gentle hotbed, watering them with tepid water, and shading them from bright sun until they are rooted, when they should be potted off singly into 3 and 4 inch pots in light loamy soil, with a little thoroughly-decayed cow-dung, sand, and charcoal-dust, well mixed together. When potting, give them a firm hold of the soil, and water them gently with tepid water; after which plunge them in a warm pit, and keep close and shaded for a few days till they take a hold of the new soil. When they have filled these pots with roots, shift them into 5 or 6 inch ones, using the same compost in a rougher state, after which they will grow away vigorously, and require to be pinched and have the growths nicely regulated, and occasionally syringed overhead on fine days after noon, to keep up a moist growing atmosphere.

The next shift will be into 8 or 9 inch pots, which is quite large enough to flower them in during the winter; and they produce their flowers in great abundance when a little pot-bound, and gently stimulated with manure-water. The points must not be pinched too late in the autumn. They will throw out abundance of flowers at the axils of the leaves if grown in a light airy position, and have a temperature ranging from 50° to 55°. They will luxuriate in a Melon-house along with Primulas, and should be treated much the same, or in a warm greenhouse near the glass.

We have it thriving admirably planted out on the back wall of a vinery, where it is not too much shaded, and the quantity of flowers it produces in such a position is something marvellous.

The plants must be liberally supplied with liquid manure when making their growth, and occasionally throughout the winter months. It also "tells" well as an exhibition flowering-plant when grown on

to a large size, the white flower in great profusion on a large well-trained specimen being almost unique. Some of the best-shaped plants which have flowered during the winter should be selected for this purpose, and partially shaken out, repotted, and cut back, and placed in a gentle heat, and grown on to any size which may suit the cultivator's taste and convenience.

DUNDONIAN.



ECONOMY OF FUEL IN HORTICULTURAL ESTABLISHMENTS.

I OBSERVE that a paper has been read before the Scottish Horticultural Association by Mr A. D. Makenzie upon the above subject, which is attracting so much general attention at the present time.

Mr Makenzie has, I daresay, from his own point of view, almost riddled the subject; and with many of his statements I am not at all disposed to disagree, because they are the rudimentary principles which I was first taught when I entered the garden as a lad—a good many years ago now. The principle of heating by hot water is being discussed, to my mind, in a very masterly manner in the pages of 'The Gardener' at the present time; and I am proud that it is one of our practical horticulturists (who are the bone and muscle of gardening) who is directing attention to another principle of heating which, if his reasoning turn out to be correct, will be a great boon to gardening generally, and remove obstacles which have hitherto been regarded as insurmountable. My object in writing these remarks is not because I wish to signalise myself upon this particular subject as far as the "principle" of heating is concerned, but, on the contrary, with the object of supplementing Mr Makenzie's remarks by taking another view which may not have come under his notice.

I may perhaps remark that I have had opportunities of witnessing the progress of horticulture in its various phases, and under varying circumstances. In addition to this, I have sometimes been consulted by gentlemen who lived in the neighbourhood where I resided as to the best form of house, its aspect and internal fittings, for cultivating certain plants or fruits at various seasons. This position sometimes brought me into contact with persons who had undertaken duties of which they are as ignorant as I am of the Zulu tongue. It must be borne in mind that a gentleman may be an accomplished scholar—his training may have been of the most profound and erudite character, he may have excelled in science, natural history, and mathematics—and yet be totally unfit to advise as a garden architect. To bring matters to an issue at once, I may state that my argument is, that no architect is an authority on practical gardening save the "practical gardener." This is no reflection upon the social position, the intelligence, or education of the architect

who could span the Menai Straits with a tubular or suspension bridge, or who could lay a tunnel under the water from Dover to Calais. It is simply a matter of people confining their sphere of operations to what they thoroughly understand. Now this is not so in gardening, and this is why so many of the misfortunes alluded to by Mr Makenzie occur in horticultural building and heating (for really the two branches are almost inseparably connected). The proper authority, the gardener, is not consulted in the first place; or if he is, it is when it is too late. Let it be distinctly understood that I recognise, in the fullest degree, the assistance that the experienced horticultural architect or hot-water engineer can render to the gardener, and *vice versa*; but however full the information of the former may be, he must have the "key-note" from the gardener, otherwise he will signally fail in executing his work, in nine cases out of ten, in a manner that will give satisfaction afterwards. I know from experience that there are persons who are often called upon to advise in horticultural matters who have no practical knowledge of building or heating, and yet have the courage, or rather the assumption, to usurp the gardener's duty, because the gardener does not resent their approaches in that dignified manner which would bring things to their proper level. For the benefit of those who may not be acquainted with these gentlemen, I may state that their *modus operandi* is as follows:—

They get an introduction to a gentleman, perhaps through a friend, and the wiles of diplomacy are set steadily to work to extract from the gardener a practical base to work upon. I have found, as a rule, that these "quacks" are extravagant in their habiliments, with appendages which need not be described dangling about their raiment, and carry politeness to the extreme during the first interview. Their object is manifest enough, and it is a great strain upon patience even to "play" with or listen to the chatter of these "dressed dolls"—the "toys" of horticulture. Now, if you divest these small gentry of their external paraphernalia, you have nothing left but the skeleton of assumption in its meanest shape. I once heard one of these worthies say that he purchased the leading horticultural organ every week as a proof of the intimate knowledge he had acquired in heating and building from a perusal of the drawings contained therein. Half, if not more, of the horticultural buildings of Great Britain are rendered comparatively useless from the above cause and others of a kindred nature. The very vitals of horticulture are being eaten to the core, and yet there is not a single voice raised in its defence from the experienced builder or gardener.

Mr Makenzie is quite right when he recommends to a body of practical men that the quantity of piping put in a house should be in proportion to its cubical contents; but surely Mr Makenzie must know that practical gardeners know all this vastly better than he can tell them, and are better able to decide as to the quantity of heat they

require in an early or late vinery, a plant, stove, or intermediate house, from their own practice.

If there is anything I do like to see, it is that people occupy their proper positions in society without encroaching upon the duties of others.

In the main, I agree with much that Mr Makenzie has said with regard to boilers and heating. The fault I find is, that he has said so little that everybody does not know. I have worked the terminal saddle, the Whitley Court, and many others, with more or less success, according to the knowledge of those who "set" the boilers and arranged the work, which is, after all, the great point in heating; and I have also seen Wright's boiler (which Mr Makenzie has gone out of his way to condemn) giving the highest satisfaction at two places, in one of which the head-gardener is something of an engineer as well as a horticulturist.

The point which I would like to see Mr Makenzie determine for us is, how it is that we have for years been burying money in deep stoke-holes when it is quite practicable to do the work without them. I visited a garden some time ago, where, to obviate the necessity of sinking a deep stoke-hole, an expansion-box was fixed several feet above the boiler—the water rising in the flow-pipe into the expansion-box, and then descending perpendicularly a distance of 7 feet into the pipes, which are set on a "dead level" throughout their entire length, except that the return-pipe dips a little a few feet from the boiler.

PRACTICAL GARDENER.



SMALL CHRYSANTHEMUMS FOR HOUSE FURNISHING.

USEFUL as the Chrysanthemum undoubtedly is when grown into large bush specimens for conservatory embellishment, or in the various other ways in which it is trained and cultivated, there is no form in which it can be grown that is more useful to the gardener than that of growing it in small pots for stands or vases for indoor furnishing. These plants when properly cultivated in small pots are so useful for arranging *en masse* at the base of large mirrors, or for grouping together in stands in their different colours, as well as forming front lines to groups of plants, that it is a wonder they are not more generally employed for the purposes above described.

The reason may, however, be explained to some extent by the fact that the mode of cultivation which is necessary in order to secure dwarf plants for such a purpose is not generally understood.

It may appear strange to many cultivators of the Chrysanthemum to learn that the month of August is the proper time to propagate for this purpose; but of course the ultimate result depends a good deal upon the strength and condition of the cuttings when they are taken, and to

the treatment they receive while they are forming roots. The plan of propagating that I have found to succeed best is to raise a gentle hot-bed by collecting a little short grass and leaves, and mixing them well together so as to generate a gentle moist heat. This being done, a number of small sixty-sized pots—say from fifty to a hundred, as the case may be—should be got in readiness, by having them clean washed and a single crock placed in the bottom of each pot for drainage. The pots should then be filled to within half-an-inch of their surface with a liberal compost of good loam and rotten dung well incorporated together. The next point of importance is the selection of cuttings in a proper condition. These should be taken from bush-plants that are growing vigorously after the “bud is formed”—or set, as the common phrase goes—about the second week in August. The secret of success lies in having the bud just formed, and in rooting the plant as quickly as possible. When the cuttings are being inserted a hole should be made in the centre of the soil in each pot, into which put a little leaf-mould and sand mixed, and press the cutting firmly into it, then plunge the pots into the bed already prepared for their reception, and dew over through a fine syringe. The plants should never be allowed to see the sun nor to droop a leaf while they are rooting, as their beauty depends in a great measure upon their being furnished with fine glossy leaves. As they are found to be rooting, gradually withdraw the shade, and keep the soil in the pots loose on the surface. The bottom-heat will be daily on the decline as the plants are rooting, and air should be admitted more or less as the plants will stand it, until they will bear exposure altogether, by which time the heat in the bed will have died out, and the sashes may be removed from over the plants. All the buds should be removed when large enough but the centre or conical one, before the latter gets distorted by the smaller buds pressing against it. A sharp-pointed stick with the point slightly bruised between the teeth answers well for the purpose, and is not likely if it touches the main bud to puncture it.

The small pots are best kept plunged all through the autumn, but there should be some hard substance placed under the bottom of each to keep the roots from travelling outside the pot. The plants require extra attention in watering, and should be frequently supplied with liquid manure, even while the buds are expanding, at which time they should be removed to a shelf in a light airy structure, and kept at a temperature of 55°, with air on night and day, except in case of excessive damp or frost. In the former case the temperature should fall five degrees at night, and the atmosphere of the house should be thoroughly dried up before the house is closed in, as excessive moisture condensing on the opening flowers is likely to spoil some of the petals and thus spoil the symmetry of the flower. The object of the warmth is to “grow out the petals to their full length,” and the liquid manure will assist to produce substance and breadth of petal as well as colour.

The varieties best adapted for this purpose are the "self-incurred" sorts, such as George Glenny, Mrs George Rundle, Mrs Dixon, Prince Alfred, Little Pet, General Bainbridge, White Globe, Sir Stafford Carey, Mr Gladstone, General Slade, St Patrick, and Blonde Beauty. I may remark, in concluding, that flowers grown as I have described are not to be supposed as being inferior in any way to those grown upon large plants—their great beauty and attractiveness being in the fine large flowers ; while the plants are so small that they can be used either singly or in groups for almost any purpose. W. HINDS.



PLUMS FROM THE PLUM-HOUSE AT CHATSWORTH.

ABOUT the middle of July Mr Speed kindly forwarded us fifteen varieties of Plums from the Plum-house at Chatsworth, his object being to show which varieties are best suited for forcing. The fruits were all from trees planted out and treated alike in the same house.

Rivers's Early Plum had been fit for use since the end of June, and the specimen of it was quite shrivelled. The next earliest was the Czar, and it was just fit for gathering, but nothing more. Belgian Purple, Goliath, Blue Prolific, and an unnamed variety, were just beginning to get a little soft. Kirk's Seedling, Jefferson, Greengage, Transparent Gage, Victoria, Angelina Burdett, Guthrie's Late, Belle de Septembre, and Golden Drop, were all hard and green. This collection made it very manifest that Rivers's Early is by far the most useful of the lot for early forcing, and the Czar succeeds it closely. It will also be very apparent how useful a Plum-house must be when planted with such a collection as the above ; for from the period Early Rivers is in season, to the time when such as Coe's Golden Drop comes into use, is a very long one. Considering how very useful a fruit the Plum is, and how much it is improved by being grown under glass, it is rather surprising that Plum-houses are not more plentiful, especially in localities where the crop of fine Plums is a precarious one.

We received at the same time a sample of a seedling Tomato raised by Mr Speed, which for size and flavour surpassed anything we had previously seen. It was nearly a pound weight, and Mr Speed says it is as remarkable for its free bearing, and suitability for early forcing, as for its size and quality. It cannot fail to be an esteemed variety, now that Tomatoes have so well-deservedly become a popular vegetable.

ROUND LONDON.

Continued from page 381.

THE next garden visited was altogether different from the general ruck. Old fashioned flowers occupied borders and beds, and even encroached indoors, for two houses have been built entirely for the culture of the rarer sorts. This is the garden of Mr Joad, Wimbledon Park, one of the most interesting gardens visited. There are, as a matter of course, the generally grown stove and greenhouse plants, Grapes, &c., here, but the great point of attraction is the splendid collection of Herbaceous and Alpine plants, a class of plants that one visit fails to satisfy. This locality is extremely rich in well-kept gardens, but we can only note the more important. One, a report of which appeared in the 'Gardener' some five years ago, has undergone great changes in the meantime. This is the seat of Sir Henry Peek, M.P., Wimbledon House. Since Mr Ollerhead has managed these gardens, many of the specimen plants have been got rid of, and fruit-growing gone into more extensively. The mode of filling structures with bearing trees is somewhat differently gone about here than in other gardens. Two houses are required for Fig culture: Mr Ollerhead forthwith lifts a tree large enough to fill the house at once, and directly there is a Fig-house in full bearing. The Grape-Vines are considered unsatisfactory: a crop is cut off them, say this July, the Vines are cut down directly, the house filled with young canes the same season, and twelve months after Grapes are approaching the colouring process in these same vineries. Heavy crops are growing in the Peach-houses, Pines are planted out in beds, pits are full of Roses, Orchids are grown in housefuls, and everything being made the most of. A few miles further on is Lord Londesborough's garden, at Norbiton. A few years ago this was a wheat field, now there are large fruit-trees of all kinds in full bearing in the open, quarters of all kinds of vegetables, hundreds of feet run of vineries in full bearing, Peach-houses, Strawberry-houses, Orchid-houses, Rose, Gardenia, and Geranium houses, besides pits and houses filled with numberless other plants useful for furnishing and producing cut-flowers. I may just note that the only kinds of Grape grown are Black Hamburg and Muscat of Alexandria, and these are had all the year round. The Vine borders are merely the top spit of a wheat field, the subsoil 600 feet deep of clay—so says Mr Denning. The Vines have been planted five years, and are in grand condition, the bunches averaging from 2 to 3 lb. each. Peaches are trained in the shape of the letter Y, one tree to two sashes. Strawberries are grown extensively—Keen's Seedling and Garibaldi the only kinds grown. Fulmer's Forcing is the only French Bean grown; Lord Kenyon's favourite the only Cucumber; Christine, Vesuvius, and Madame Vaucher the only Geraniums to be found here. Mignonette is grown by the thousand potfuls; Hoteias, Lilacs, and other furnishing plants, in like proportion. The collection of Orchids is one of the most extensive and rare in England, and the whole establishment one that it is necessary to see, to fully understand. A short distance along the Wimbledon Road is Coombe Cottage, Mr Baring's residence. "The shades of night were falling fast" before we had seen much of the well-kept gardens. Grapes and other indoor fruits are well grown here. There are many fine specimen stove-plants, and amongst Orchids Mr Baker is obviously quite at home. Some of the strongest grown Dendrobies we have ever seen are here, grand specimen Cœlogynes, Pleiones growing in pans close to the roof in robust health, and others too numerous to mention. Mr Baker has

some wonderful Cauliflowers to show, manured with nitrate of soda at the rate of $1\frac{3}{4}$ cwt. to the acre; quarters of Potatoes, some without the soda, the remainder dressed as above, show the value of this as a manurial agent very strikingly. Next day, after a run through Kew, which is as interesting as ever, we called at Gunnerbury Park, Baron Rothschild's seat, near Acton. Mr Roberts unfortunately was not at hand, but his foreman kindly showed everything of interest there was to be seen. As is well known, the Grape-Vines at Gunnerbury Park were destroyed by *Phylloxera*, so that the vineries themselves are the most interesting things connected with Grape-growing. One lean-to range is some 25 or more feet wide, and proportionate in height. These are heated by means of 11 rows of 4-inch pipes. Another span-roofed house is about 40 feet wide. When filled and in full bearing, these structures must be a "sight worth seeing." The cool Orchids, *Phalænopsids*, and *Vandaceous* plants are another feature of this garden. The *Odontoglossums*, as a whole, are the strongest and healthiest we have ever seen. The material used for potting is apparently almost entirely peat, the plants being set on top of a cone of that material. A plant of *O. vexillarium* had 139 flowers open at time of visit. In the East Indian house the *Phalænopsids* are in the most robust health. In the same house is the grandest lot of *Ærides*, *Saccolabium*, and *Vandas* I have ever had the privilege of seeing. Beside these, the other stove plants, the hundreds of feet of Peach-trees in wall-cases, and the many other good things at Gunnerbury, are denuded of the interest otherwise attaching to them. There are many other places of interest in this neighbourhood which we have not space to notice. The last garden we can make note of is Mr Whitbourn's, Loxford Hall, near Ilford, Essex. This garden is replete with interesting things. Mr Douglas devotes himself to growing so many things well that, although the garden is not a large one, the time flies by unheeded, and the note-book gets filled to repletion. Orchids, though not a large collection, are exceedingly well grown, and many fine pieces are to be found here. In the stove are several fine plants—*Dendrobium Devonianum* and *D. Wardianum* in grand order; several plants of *Odontoglossum vexillarium*, and varieties of *O. Roezlii*; a large piece of *Dendrobium libuiflorum*, *Oncidium lanceanum*—a large basketful in flower; besides various *Cypripediums*, *Cattleyas*, *Ærides*, &c. Two fine plants of *Adiantum concinnum latum* are also growing here. This is one of the finest of the genus, though somewhat rarely seen in good order. The Pine pits are now devoted to plant-growing. Especially noteworthy here are *Anthurium Schertzerianum* and *Dendrobium nobile*—grand plants. A *Muscat* of *Alexandria* planted in a small pit and growing overhead in one of these houses, is in grand form. In the *Odontoglossum* house are a few of the largest and healthiest plants of *O. Alexandræ* we have noted; a grand *Oncidium macranthum*, just opening; several large pieces of *Epidendrum vitellium majus*—one large plant making its growth and flowering the same year. Here are also large specimen *Masdevallias*, and *Lælia majalis* is doing well on a block. The greenhouse is full of specimen plants of such things as *Bougainvillea glabra*, *Erica Cavendishii*, and others; large *Azaleas*, *Statice profusa*, grand in colour, &c. In a large orchard-house are the last of the pot Strawberries, Loxford Hall seedling, a very late and dwarf variety. In front of this structure are some 500 Carnations and Picotees in pots, and a large quantity of healthy *Chrysanthemums*. The alpine *Auriculas* are also grown here. In a pit are flowering the newest of the show *Pelargoniums*; a collection of Hardy Orchids in fine health; a large case of filmy Ferns contains a unique collection of these. Amongst others are fine

plants of *Todea Fraserii*, *T. plumosa*, *Hymenophyllum flexuosum*, and *H. demissum*. *Gleichenias* are also grown in this pit, a healthy piece of the scarce *G. flabellata* doing well. In a small lean-to orchard-house is a quantity of seedling *Aquilegias* flowering. Behind the late vineries are the frames containing the collection of show *Auriculas*; there is some 50 feet run of these, named sorts and seedlings. In the vineries themselves are good crops of Grapes. In a line with these is another range of small houses, the first being devoted to *Cattleyas* and kindred plants. In this house are three pieces of the lovely *Oncidium concolor* growing on blocks, and which flower profusely. A large piece of *O. Marshallianum* is also in this house, and many other species of interest. In the next compartment are two plants of *Dendrobium Dalhousianum* making remarkable growths. Cucumbers, Crotons, Oranges, and Pines are also grown in this range. Space does not allow us to do more than mention the collections of Pinks, herbaceous plants, Dahlias, Pyrethrums, Pansies, &c., which are grown here. There are several good gardens in the district, but the rain, which had held up wonderfully, again commenced, and we made a hasty retreat over the Border, to find the Lammermoors wreathed in mist, and the next day the heaviest flood in the Tyne there had been for the last thirty years.

R. P. B.



SCOTTISH HORTICULTURAL ASSOCIATION.

THE monthly meeting was held in the hall, 5 St Andrew Square, Edinburgh, on the evening of Tuesday, the 5th ult., Mr M. Dunn, President, in the chair. The gentlemen proposed as members at last meeting having been formally admitted, and the names of six others being given in for admission at next meeting, Mr Andrew Kerr read a paper on the "Early Forcing of Dutch Roots, Rhododendrons, Deutzias, &c." The principal features of his practice in dealing with all these plants were—a house with a southern aspect, and plenty of piping, so as to secure the greatest amount of heat. The plants to be forced should all be potted as early in the autumn as possible, and the heat should be applied gradually: in no case should they be taken from a cold pit or the open air, and introduced at once into excessive heat. While forcing, each should have an abundant supply of water. For very early flowering Hyacinths, he knew no better sorts than Roman, which could be had in December; and of the ordinary sorts to come in later, La Precose, single white, Homerus, single red, and Grand Lilas, single blue. The best early Tulips were the different double and single varieties of Van Tholl, which came in first, and which were followed by the Tournesol and its varieties. Mr John Cowe, Superintendent of the Metropolitan Cemetery, followed with a paper on "The Hyacinth," in which he described the mode by which he had so successfully grown that plant for many years past. After remarking that it was by no means particular as to soil, he had found that a mixture of rich loam, leaf-mould, and river sand, was the best compost that could be used. The pots should always be well drained, and he was accustomed to put a handful of old rotten manure above the crocks. After potting, which should be done as soon as possible after procuring the bulbs, they should be plunged in a shed, in sand or ashes, and never allowed to become wet. So soon as they start, and it is found that the pots are well filled with roots, they should be placed in an airy frame or greenhouse, close to the light, abundantly supplied with water; and an occasional dose of weak liquid-manure should be given during the whole growing season. Though not able to assign a reason for the fact, he had found as the result of

his experience that Hyacinths grew better in old than in new pots, and strongly advised beginners never to use the latter if old ones could be got. At the close of his paper, Mr Cowe promised to read a short description of the sizes and forms of bulbs likely to produce fine flowers, as he had found that each sort had its peculiar and well-marked characters. The concluding paper, sent by Mr Mackinlay, Tulloch Castle, and read by the Secretary, was on the "Pear, its Cultivation and Management." The author dwelt at some length on the importance of careful treatment while the trees were young, and urged upon gardeners to be careful in the selection of sorts likely to be suitable for the district, and at the same time such as would ripen their fruit in succession. This paper, though short, was eminently practical, and full of suggestive hints to young gardeners. The reading of each of the several papers was followed by an interesting conversation, and at the close the usual votes of thanks were cordially tendered to their authors. Of the subjects tabled for exhibition we noted a number of well-bloomed spring-struck regal Pelargoniums, including some of the most choice sorts, from Messrs Thomas Methven & Sons: these were dwarf, bushy plants, and fine examples of successful cultivation. Messrs Dickson & Co. had a large group of hardy herbaceous plants, including Campanulas, Linums, Potentillas, Tritelia, Dianthus, &c. &c. Mr Dow sent a spike of a variety of Seakale, six feet high, which will undoubtedly, as was suggested, be a welcome addition to the Sub-tropical or Wild Garden: he had also a fine specimen of the stately and curious *Arum dracunculoides*. David Paterson, Esq., Restalrig Park, Leith, sent a branch of *Cephalotaxus*, and a flowering branch of the old-fashioned but now unfortunately too much neglected *Clethra arborea*, a greenhouse or lofty conservatory shrub of great beauty. Messrs Todd & Co. had spikes of *Gladiolus The Bride*, a superb variety, worthy of extended cultivation. Mr George Robertson had a very choice collection of blooms of herbaceous plants, and Mr Dunn, Dalkeith, a box of fine fruit of Strawberry James Veitch.



NOTICES OF BOOKS.

THE FERN WORLD. By Francis George Heath. Serial publication. Sampson Low & Co., London.

WE have the eighth part of the serial issue of this charming book before us. It contains beautifully correct coloured plates of the soft prickly Shield Fern, the Holly Fern, and the hard prickly Shield Fern. The letterpress deals with the Parsley Fern, the Bristle Fern, the Moonwort, the little Adder's Tongue, and the Common and Mountain Polypodies. We have already referred to the pleasing and instructive character of this work. All lovers of Ferns, and every naturalist, should possess the work.

CATECHISM OF AGRICULTURAL CHEMISTRY. By Professor Johnston. William Blackwood & Sons, Edinburgh and London.

THIS is a new edition of a work which has passed through thirty-six editions, and which has been translated into nearly every European language. It is revised and enlarged, and in every respect brought down to the present time, by Charles A. Cameron, Professor of Chemistry to the Royal College of Surgeons. Having intimated thus much, we need hardly say more in commendation of the work. It ought to be learned by heart by every gardener and farmer, for the questions it puts and answers lie at the very foundation of the culture of the soil and the rearing of crops; and it only costs 1s.

Calendar.

KITCHEN-GARDEN.

THE push of general work will now be well over for the present season, so far as active cropping is concerned; but it is not likely that there will be much time to spare from active labour in the best kept of gardens. We find, from the lateness of the season and the long-continued heavy rains, that many arrears are to be brought forward. Most crops are good and abundant—they have been secured with much trouble—and the ground (strong clay) having been manipulated under the most difficult circumstances, it is far from our idea of “high cultivation.” Therefore, in such cases prong and hoe must be plied with extra vigour. Soil which has been properly worked in former years will not suffer much for absence of spade or manure, should it be found very difficult to give the manure needful for one season. Thorough surface-breaking will do much to improve the crops. Weeds have everywhere been a formidable enemy to cultivators this season; and if they have seeded to any extent, they will give plenty of labour for a long time to come. It has been our practice periodically to turn every hand on weed-destroying—going over every portion of the ground before a halt was made, never waiting till they get any size; and by this means we have comparatively saved much labour, and have a weedless garden to boot. Those who adopt the system of allowing the weeds to seed will find that they have always abundance of labour on hand, and a very shabby garden. Some weeks ago we had some thirty-six cottagers’ allotments to go over, and to adjudicate seven prizes for the best cropped and best kept. All were under such good cultivation, that it was difficult to give the awards—weeds there seemed to be none, but no vacant soil was to be seen anywhere. Even in such a season it shows “where there’s a will there’s a way.” A general clearance of all remains of crops should be made. When there is nothing being returned from the ground, better to have it clean than burdened with decaying vegetation. Thinnings of crops, especially those to stand through the winter, should be

made without delay. Crowding makes them tender and ill-suited to battle with severe frost or much damp. This applies to Parsley, Spinach, Turnips, Lettuce, Carrots (late sowings for drawing young), Onions, and Radishes. Thinnings of Parsley, Spinach, Lettuce, and young Onions may be transplanted if there is likely to be a scarcity of them. More Cabbage may be sown, to be a succession to the main sowings; or should they have an accident, a few hundreds of plants ready to plant out in March or April will be of much service where there is a heavy demand in the early summer months. Plant out thickly all Cabbage which are forward enough for planting; others may be pricked out for October planting. Deeply-trenched ground, with a good coating of rich manure under the top spit, will keep the crop safe through the winter, and when the roots become active in spring, they will run greedily into the manure, and the Cabbage will be of great size and very tender. Cabbage grown on poor sandy soil in starved condition are of inferior quality—tough and indigestible. Cauliflower may be sown again in a shallow frame on light soil: a handlight or two would protect a good succession, and if kept growing with plenty of light and air, and kept thin, they would be excellent for planting out next April. Plant under handlights, or other protectors, on a sloping border well sheltered, the Cauliflowers which are to come in early. Coddling must be strictly avoided. The same applies to Lettuce to be brought forward under protection: have many more planted out than the number likely to be applied. Carrots sown now—Early Nantes and Shorthorn—would come in very useful where young Carrots are in request. We find most people will use these when they can get them easily. Soil made fine, and well dusted with soot and ashes, is a suitable position for them. Celery may be well earthed up (well watered with manure water first). Keep all suckers off; and if slugs are likely to be troublesome, dust with lime and finely-sifted ashes. Better to plant up vacant ground thickly with

Kale, Savoy, and other kinds of crops, than have it empty during the winter. It is yet too soon to allow ground to be prepared by trenching for next year's work; but rather than it should be a receptacle for weeds, trench it up and expose a rough surface to action of the weather: it could be forked over and well manured for cropping after the turn of the year. Turnips may (in some southern localities) be sown early in the month to fill up Potato-ground; but in northern parts this cannot generally be done with any degree of service. French Beans and Scarlet Runners may be protected with glass frames, or hoops, on which mats may be thrown over at night. The season having been so late, it is all the more necessary to prolong the supplies as far as possible. More French Beans may be sown in pots

and in frames to succeed those in open ground. Protect Vegetable Marrows, ridge Cucumbers, Ghirkins, or other tender crops, when weather may seem inclined to be frosty: cold drenching rains would help to prolong the season of these. Tomatoes and Chillies may be protected in the same way. They have been grown this year with more than ordinary labour, and should be made the best of. Potatoes in pots and frames ought to be protected when they are growing: if placed in a sheltered position where light and air will reach them freely, covered hoops or a framework of mats would keep them safe during frosty nights. Mushroom-beds may be made behind walls, in cellars, out-houses, or anywhere. Get a stock of soil and other necessities ready for winter forcing of vegetables. M. T.

FORCING DEPARTMENT.

Pines.—About the middle or end of this month is a good time to pot a second batch of suckers from plants that have recently ripened fruit. For Queens 6-inch pots, and for strong suckers of strong-growing sorts 7-inch pots will be large enough. Select, if possible, a rather light turfy loam, adding a 7-inch potful of bone-meal to each barrow-load of soil. Pot firmly and plunge in a bottom-heat of 90°, giving the young plants plenty of room, and keeping them within two feet or so of the glass. Very little shade will be required for newly-potted suckers at the end of the month. Keep the air moist and the pit rather close till roots are formed, when more air should be given. Suckers potted early last month or in the end of July will be growing freely, and will require to be kept steadily moist at the root, and will do with more air and all the sun they can get. If for convenience they have been plunged thickly, let them have more room before they get crowded. These, as well as newly-potted suckers, may be lightly dewed with a fine syringe at shutting-up time on fine days. All Queens intended for starting early next season should now have their pots well filled with roots, and be otherwise well matured. Give them no more water than is enough to prevent their getting a check. The minimum night tem-

perature for these should drop to 65° by the end of the month. All syringing of these should now be discontinued. Encourage such as are not so forward, and that are to succeed the earliest, to grow freely all through this month, until they too are strong and have thoroughly filled their pots with roots. But as the daylight is now fast decreasing, avoid a forcing temperature at night, or the plants will become drawn. Smooth Cayennes and other late sorts more recently shifted into their fruiting-pots should be kept moderately moist at the root, and have a good supply of moisture in the air. In the case of these especially, avoid all extremes that would be likely to check them and be the cause of their starting before making a considerable fresh growth early in spring. Let the night temperature in mild weather range to 70° when the weather is warm, with a few degrees less when cold. Shut them up early in the afternoon, so that the heat for a short time stands about 80°, and give a little air in the morning when it exceeds 75°. All fruit now swelling off should have a temperature of 70° at night. Water them with guano-water in a weak state every time they require watering. Keep the bottom-heat from 85° to 90°, and see that the air is kept genially moist. In fine bright weather the

syringe may be used several times a week; but avoid wetting the crowns, or they are apt to grow to an unsightly size. Give all fruit colouring a free circulation of dry warm air, but do not dry them off severely at the root. Remove any that have to be kept for a time after ripening to some cool dry place with an even temperature.

Grapes.—The season has been so unusually wet, sunless, and cold, that Vines which are in robust health are likely to be imperfectly ripened for another season's crop. In all cases where this is likely to be the case, apply fire-heat immediately the Grapes are all cut, and keep a circulation of dry warm air about the foliage and wood until the mould is well consolidated and the buds matured. If the wet continue, it would be well also to throw the rains off outside borders by means of shutters or glass lights. It is to be feared that even the very earliest Vines will not be ready, as they sometimes are, for pruning at the close of the month. Perhaps, now that we have so many late-keeping varieties, and early crops are so generally produced from pot-Vines, there is less necessity for the very early pruning of permanent Vines. Recently-planted Vines may have made vigorous growths, and will also require an extra amount of artificial means to thoroughly ripen the wood. The stronger they are, the more heat will be necessary to mature the wood. Pot-Vines intended for early forcing should, if possible, be thoroughly ripe, and about ready for any pruning they require by the end of the month. Place them in a cool place where they will rest thoroughly until wanted for forcing. Look over all Grapes that are thoroughly ripe, especially if the wet weather continues, at least twice weekly, and remove all signs of decayed or shanked berries, and keep air about them as dry as possible. Muscats and all other late Grapes should have fire-heat sufficient to thoroughly ripen the fruit if possible by the end of the month. Look over late Vines and remove all laterals; and if Muscats are still greener than they should be, tie aside some of the leaves to let more light to the bunches. The extra amount of fire-heat will in many cases have bred red-spider; and as healthy foliage is of the utmost importance in the matter of Grapes keep-

ing well, let the foliage be examined, and wherever there is any spider sponge it off. The inside borders of late vineries should have a good watering, if dry, before the Grapes are quite coloured, and then be mulched with some dry mushroom-bed dung to prevent the moisture from evaporating and the border cracking. Examine the outlets from the drainage of all borders, and see that they are working properly, and that no stagnant water be about the roots. Any Vines that have their roots far from the surface should, on an early occasion when the border is dry, have the inert soil on the surface of the border forked up and removed, and replaced with some fresh loam well enriched with bone-meal and some decayed stable-manure. In the case of borders that through judicious management have their roots well to the surface, see that, if this month be dry, they do not suffer from over-dryness after such a season. A good plan would be to add a few inches to the mulching.

Peaches.—The season having been so unusually sunless, wet, and cold, there is special necessity for giving artificial heat to ripen the wood, especially of young strong-growing Peach-trees, thoroughly. Look over trees from which the fruit has lately been cleared off, and thin out all shoots that are not required to furnish the trees sufficiently for another season; and keep up a circulation of warm air in the houses until the wood is ripe. If there be any red-spider about the foliage, give an occasional washing with the engine on fine afternoons. Crops in cool houses will be ripening, and if flies or wasps are troublesome, fix hexagon netting over the ventilating opens to keep such pests out. Look over the trees every day, and gather ripe fruit before it drops. See that late varieties under heavy crops, and that have the chief of their roots in inside borders, are well supplied with water.

Figs.—The same directions as to ripening and thinning the wood that have been given for Peaches are applicable to Figs from which the second crop has all been gathered. Keep the foliage fresh and healthy as long as possible, and to this end use the syringe or engine occasionally on fine afternoons. Where late crops are swelling and ripening off, give water-

ings of dung-water to trees that are old, and bearing heavily in limited borders; and when the fruit are ripening use a little fire-heat, and give a free circulation of dry warm air, or the Figs will be insipid. Early plants in pots that have well ripened their wood but not yet shed their leaves may be placed in a warm exposure outdoors.

Melons.—Apply fire-heat to these so as to keep the night temperature at from 70° to 75°, according to the weather. Be more careful now in giving water to plants that have full-grown but not ripe fruit on them. After this season the fruit has a tendency to split if too much water be given. Keep ripening fruit dry and warm, and as fully exposed to sun as possible.

Cucumbers.—Add a little fresh top-dressing of manure to the border

of any plants that show any signs of exhaustion. Keep up the same temperature recommended for Melons. If mildew appears, dust with sulphur, and keep the air a little drier for a time. Plants intended for winter bearing should be planted out by the end of the month: use a rather light rich soil, and not very much of it to begin with. Grow the plants on with a good supply of air and not a too high night temperature, so as to get the plants robust before short dull days arrive.

Strawberries in Pots.—See last month's directions. If the weather should be bright and dry, they will require good supplies of water. Where plants are making more than one or two crowns, remove the weakest. Keep them free from runners and weeds, and give them plenty of standing room.

Notices to Correspondents.

All business communications and all Advertisements should be addressed to the Publishers, and communications for insertion in 'The Gardener' to David Thomson, Drumlanrig Gardens, Thornhill, Dumfriesshire. It will further oblige if all matter intended for publication, and questions to be replied to, be received by the 14th of the month, and written on *one side* of the paper only. It is also requested that writers forward their name and address, not for publication unless they wish it, but for the sake of that mutual confidence which should exist between the Editor and those who address him. We decline noticing *any* communication which is not accompanied with name and address of writer.

AMATEUR.—The leaves should never be cut off Strawberries. Remove all the runners as soon as the fruit is over. 1½ cwt. to the acre of nitrate of soda is an excellent manure for Strawberries. For early crops, grow Keen's Seedling; second early, Garibaldi and President; for latest, Elton Pine.

A SUBSCRIBER.—Mix phosphoric paste with some mashed Potato, and lay it on pieces of slate in their haunts, and syringe the same with paraffin, at the rate of two wine-glassfulls well mixed with a gallon of water. The common toad introduced into your greenhouse will feast on them.

THOMAS SMITH.—The growths you have sent us indicate that the trees have had too much wet, and too little sun. Of course if your trees are, as you say, dying, it will be best to replant. See that the border is well drained, and if possible, add some fresh friable loam to the soil.

"A Suggestion" and "Kalosanthos" next month.

ERRATA.

IN our notice of Sir Garnet Wolseley Cucumber last month, we gave the name of the raiser as James Hamilton. It should have been Joseph Hamilton & Son, Carlisle.

THE GARDENER

OCTOBER 1879.



FLOWER-GARDENING OF THE SEASON.



LOWER-GARDENING has been, for the season which may be said to be now gone, gardening without the flowers. The spring gardening was only a partial success, or almost a failure, from the havoc the severe winter made among things of a herbaceous and annual character, bulbs being also late, and the whole effect patchy and unsatisfactory. The summer bedding has throughout had to struggle for existence. Tender foliage plants, both dwarf and tall, have been starved out ; exotic succulents have been rotted out ; and the flowers of Geraniums, Calceolarias, Violets, &c., have been washed out. Such is the tale which has generally to be told, especially on retentive soils. In situations where the soil is light and porous, a fair display of flowers is to be found, though of a beaten and imperfect aspect. Flowering plants of the bedding section, on the whole, have had but a draggled time of it.

If anything has been more satisfactory than another, it is plants of the hardy herbaceous class, whether of the low carpeting character, as the Saxifragas, Sedums, and Antennarias, or of the Funkias, Bamboos, Bocconias, and suchlike. Even the flowering herbaceous plants have all done well, especially those of any sturdiness and substance, such as the Delphiniums, Campanulas, Alstrœmerias, and now even the Phloxes and Dahlias. The Spiræas, among flowering shrubs, are making at the present time a fine show, with a great variety in habit of growth and colour of flowers. These, with their herbaceous relations, are really indispensable, and destined to be much more largely planted. A lesson is to be learned from all this in the consideration that our flower-gardening is entirely dependent on the state of the weather, and that since

weather forecasts of six months cannot yet be achieved, we ought to prepare a due proportion of dull weather as well as sunshiny beds, the former to predominate, in deference to the prevailing climate of these islands.

Fortunately there is a growing public taste for the interesting as well as for the gaudy flower-beds, and these may be made both showy and tasteful by a judicious mixture of herbaceous and foliage plants, banding them round with edgings of the summer bedders, or embroidering them with hardy carpeting plants; or more prominence might be given to tall foliage plants, such as *Solanums*, *Cannas*, even hardy Ferns, banded with *Geraniums*, *Calceolarias*, *Lobelias* — in short, the usual summer bedders. Many of the hardy herbaceous class of plants have been quite gay this season, and point to the fact that, planted in rich soil, with attention, abundant watering, and thinning out the shoots as they go out of flower, the season of bloom would be much prolonged. In this way, we think, many might be found to yield throughout the summer months quite as good a show as *Geraniums* and *Lobelias*, and, as far as flowers are concerned, superior to the foliage plants we have just been noting. *Geranium sanguineum* is a plant which has been equal to most bedding plants this season, and might be used with advantage to fill the centres of large beds, and is all the better not to have too rich a soil to grow in. The foliage is of a bright showy green, and the flowers of a brilliant purple red.

For a yellow flowering plant, *Corydalis lutea* has been and is fine. The foliage alone recommends it, even if it were not so profuse and continuous in flowering. For a blue edging-plant, nothing could approach *Myosotis palustris*. This past season it has been a continuous sheet of the clearest blue since March. Another little plant which is suitable for edgings has been in bloom all the summer—viz., *Erodium Reichardii*, quite a carpet-plant, and it is a wonder it has not been pressed into the service before now. These four common herbaceous plants—three of them British—we feel sure would make or would have made this summer quite a showy lasting bed, planted as noted: the *Geranium* for a centre mass, with the *Corydalis* to follow in a band around, then the *Myosotis*, and last the white-flowering *Erodium*. These have all been under our eye all summer, flowering in patches, and we feel sure they will not disappoint any one trying them in a bed as indicated. We have no doubt other arrangements would occur to others better acquainted with herbaceous plants. The *Veronicas* are a large class containing tall as well as dwarf-creeping species of trim habit, and showy. Some of the Everlasting Peas are quite gorgeous on heavy rich soil, such as *Lathyrus grandiflorus* and *latifolius*, but especially the last. For large beds they should be allowed to creep over some Spruce or other branches laid over the surface of the bed, same as is sometimes done for *Tropæolum* and *Clematis*: they then make a close hard mass, with the flowers elevated above the foliage. We can vouch for their grand

effect from well-established plants, and if growing in deep soil well watered or naturally moist, they last three months in bloom. Pity they are scentless !

Annuals of the hardier sorts have had grand opportunities this year of showing their colours and characters. *Clarkias*, *Nemophilas*, *Linum grandiflorum*, *Phlox Drummondii*, but especially the upright-growing kinds or the prostrate sorts, have been beaten down and rotted by the rains. Tender annuals, such as *Asters*, *Zinnias*, and *Everlastings*, have shared the fate of the sub-tropical bedders, and pushed the hardier annuals into consequent prominence, showing what is really best worth growing. There is a richness and variety of colour among annuals which is not approached among any other class of hardy plants, and such a season as the last should arouse gardeners to the claims of the much too neglected annuals of the hardy kinds.

THE SQUIRE'S GARDENER.



NOTES FROM THE PAPERS.

WE wish the members of the British Association could be subjected to a cross-examination—some of them at least. No doubt Dr Allman, Professor Huxley, and others are honest inquirers, but they are only men after all, and may be mistaken in many things. They differ among themselves on that vital subject, “deep-sea slime,” for example—“the physical basis of life,” according to Professor Huxley, who at least appears determined to nurse his “bantling,” as ‘Punch’ calls it, into life. Dr Allman’s presidential address was no doubt intensely interesting to those who study the mystery of life and of creation ; but the question arises in one’s mind, “How far are the conclusions and speculations of the thinker and investigator to be accepted as true or even probable?” Some years ago the teachings of Darwin and Tyndall created a profound sensation—took people by storm, in fact. The questions were new, or at least revived in clearer shape, and the very audacity of the speculations advanced fascinated peoples’ minds ; but now a certain reaction seems setting in, and some little impatience is being manifested by the reading public at the strained endeavours made to bottom the mystery of the origin of life and solve the problem by scientific inquiry alone. The wish is too clearly father to the thought. There is much about creation, but nothing about the Creator. If science succeed in accomplishing this—if it were proved to-morrow that mind was the mere product of matter, originating and perishing with the body in which it was manifested—we believe that the feeling in men’s minds would be one of profound humiliation and grief. A kind of terror seems to pervade the minds of thinking people (not necessarily religious) at the prospect, or rather possibility, of science making such a discovery. Anything almost may be done or taught, we suppose, in the name of “science ;” but it cannot be denied that what the British Association teaches would at one time not so far back have been regarded as rank infidelity, or something very like it. The most interesting portion of Dr Allman’s address is that relating to protoplasm, and its nature and composition. We are tempted to give the extract here for the sake of

those of your readers who may not have read the address in the daily or weekly press:—

“As has been said, protoplasm lies at the base of every vital phenomenon. It is, as Huxley has well expressed it, ‘the physical basis of life.’ Wherever there is life, from its lowest to its highest manifestations, there is protoplasm; wherever there is protoplasm, there, too, is life. Thus co-extensive with the whole of organic nature—every vital act being referable to some mode or property of protoplasm—it becomes to the biologist what the ether is to the physicist; only that, instead of being a hypothetical conception, accepted as a reality from its adequacy in the explanation of phenomena, it is a tangible and visible reality, which the chemist may analyse in his laboratory, the biologist scrutinise beneath his microscope.

“The chemical composition of protoplasm is very complex, and has not been exactly determined. It may, however, be stated that protoplasm is essentially a combination of albuminoid bodies, and that its principal elements are, therefore, oxygen, carbon, hydrogen, and nitrogen. In its typical state it presents the condition of a semi-fluid substance—a tenacious, glairy liquid, with a consistence somewhat like that of the white of an unboiled egg. While we watch it beneath the microscope movements are set up in it; waves traverse its surface, or it may be seen to flow away in streams, either broad and attaining but a slight distance from the main mass, or else stretching away far from their source, as narrow liquid threads, which may continue simple, or may divide into branches, each following its own independent course; or the streams may flow one into the other, as streamlets would flow into rivulets and rivulets into rivers, and this not only where gravity would carry them, but in a direction diametrically opposed to gravitation: now we see it spreading itself out on all sides into a thin liquid stratum, and again drawing itself together within the narrow limits which had at first confined it, and all this without any obvious impulse from without which would send the ripples over its surface or set the streams flowing from its margin. Though it is certain that all these phenomena are in response to some stimulus exerted on it by the outer world, they are such as we never met with in a simply physical fluid—they are spontaneous movements resulting from its proper irritability, from its essential constitution as living matter. Examine it closer, bring to bear on it the highest power of your microscope—you will probably find disseminated through it countless multitudes of exceedingly minute granules; but you may also find it absolutely homogeneous, and, whether containing granules or not, it is certain that you will find nothing to which the term organisation can be applied. You have before you a glairy, tenacious fluid, which, if not absolutely homogeneous, is yet totally destitute of structure. And yet no one who contemplates this spontaneously moving matter can deny that it is alive. Liquid as it is, it is a living liquid; organless and structureless as it is, it manifests the essential phenomena of life.”

It is difficult to conceive of an “organless and structureless” substance possessing life; and it is on this particular and important point that biologists have not satisfied thinkers: it is not yet satisfactorily proved that protoplasm is a *living substance*. Huxley cherishes the conviction fondly, but probably he has doubts and misgivings on the subject; and his position is hit off rather happily in the following lines, published when the Association was sitting:—

BATHYBIUS: A LAMENT.

“HUXLEY (*log.*):

‘Whether you are in yourself the essence—
Potential essence of life to be—
Or merely express the amorphous presence
Of calcic sulphate, is dark to me.
I know not whether you are or are not ;
I only know that you seem to be.
I must puzzle, though others care not,
Yet puzzle is vain—I am all at sea.’

“DISCIPLE (*susp.*):

‘Broken my rest ; and torn with strange emotion
I melt in rhyme,
For a non-proven, questionable notion
Is “deep-sea slime.”
Time was I worshipped, almost a fanatic,
Before his shrine ;
Invoked his aid in language truly Attic—
“Bathybius, mine !”
But now I find this vaunted protoplasm
Excites a smile,
A doubtful kind of passing facial spasm—
And I revile !’

Exit ‘reviling.’”

More uncomplimentary things have been said about the *savans* of the British Association this year than has been dared before. One paper says, “the assumption of wisdom” on the part of some of the members is rather too transparent ; and even the ‘Standard,’ one of the soberest and fairest of critics, is mildly sarcastic on the Association. The Biologists at last, it thinks, have got to the end of their tether ; and it goes on to say, “But it may be questioned whether, as regards the origin of life, Professor Tyndall, or Professor Huxley, can carry us much beyond what Lord Beaconsfield once called the ‘atom of Epicurus and the monad of Thales.’ It is for these reasons that the British Association has probably passed the zenith of its prosperity, even if it cannot be said to have outlived its original purposes. Of course, it will continue to exist, and go on holding pleasant meetings year after year. Savants are mortal, and have the gregarious tastes of humanity. They like conversaziones and luncheon parties, and pleasant picnics to picturesque places. They are fond of reading elaborate essays, and discussing their merits. All these good things have been had at the meeting of the British Association this year, and are not likely to be lost in the future. Still the fact remains that the work of the Association as an organisation for scientific discovery and education seems to be just now at a standstill, and that it exists mainly as an organisation for the delivery of first-class lectures, and the pursuit of refined pleasure.”

The ‘Gardeners’ Chronicle’ has managed to extract from one of the papers read before the Association a passage which it hopes “will sink deeply into the minds of the so-called practical man who professes to be guided by the teachings of experience only,” and upon whom, it might be added, your contemporary depends so much for its existence. Take away the practical portion of its columns—the records of experience, crude and undigested as some of

them may be—and we wonder what would become of it! The passage it has found so applicable to the fraternity is as follows :—

“The history of science proves that unconnected, unsystematic, inaccurate observations are worth nothing; therefore it is that common experience is almost absolutely useless in all practical arts, which, without exception, depend for their progress upon the advance of science—that is, upon methodical, continuous, and scrupulously accurate observations and experiments.”

“For the present,” says your contemporary, “we confine ourselves to this extract.” So we may expect further complements by-and-by, when perhaps the accurate sayings and doings of your contemporary may come under review also.

As the season draws towards its close, we begin to gauge more accurately the effects of the unfavourable weather upon the crops. 1879 will long be remembered. A competent authority in the ‘Times’ reckons the loss on the corn, potato, and bean crops alone at forty-three millions of pounds. And this takes no account of the loss on the hay, hops, and root crops. The loss is appalling, coming as it does after a long period of depression of trade. The ‘Times’ in a leader asks: “What if next year should be like this? Bad seasons, we are continually assured, come together, and we have been lately told, apparently with a long retrospect and careful calculation, that in every cycle there are several concurrent years more or less of one character, and several concurrent years of another. If the losses in the next year be as great as those in this, or as the average of the three years, the farmers, very few of whom have any capital in reserve—very few of whom are not in debt—will have to throw up their farms. The results of such a calamity as we are suffering will extend far out of the agricultural circle. Some thousands of landowners will have to do without rent, to reduce their establishments, put down carriages and horses, turn off under-gardeners and labourers, dispose of their London houses, and reduce the season to a few weeks in lodgings or to still fewer at an hotel. They will, perhaps even less reluctantly, shut up their country houses, and live for a year or two, without care, ostentation, or even comfort, in Continental hotels. All this portends the discharge of many servants not very well fitted to make their way in the world, and loss of profitable custom to many tradesmen. Not only some kinds of industry, and some special localities also, will suffer more than their share in such an agricultural collapse as that which is at least not improbable. The residential neighbourhood of London and the watering places—that is, all the favoured resorts of the wealthy—will feel with special force any general restriction of resources and curtailment of expenditure.”

Horticulture is now feeling the effects of the depression more keenly. A London paper, usually well informed on such matters, states that gentlemen and landed proprietors are very generally reducing the expenditure of their establishments to a considerable extent, which of course means a reduction of both men and wages in private gardens, and which has already taken place in numerous instances.

The copious reports of the fruit crops in the ‘Garden’ “tell,” says that paper, “of sad disasters to Apricot trees, owing to the remarkable season which we have experienced. Branch-dying has been unusually prevalent, and many trees have died outright. Peaches and Nectarines have suffered greatly from blister, and so backward are their fruits that in many places they will never ripen. Pears, though in some cases rusty and cracking, are better this year than Apples, which are generally a thin crop, and the fruit still keeps drop-

ping from the trees. The latter, too, are in some places almost leafless. Cherries, with the exception of Morellos, cracked and rotted on the trees. Even as far north as Durham, the Morello has been better on standards than on walls—a fact worth noting, seeing that, in addition to its fruit, the growth of the tree itself is highly ornamental. Damsons are everywhere reported to be good, and in some places even heavy crops. Next to these stand Victoria and the Orleans, Plums that seldom fail. Nuts are good in many places, but Walnuts are a failure. All small fruits have been heavy crops, but flavourless; and Gooseberries have been in many places stripped of their leaves by the Gooseberry caterpillar. Of little known fruits, Helena Gloede Strawberry is spoken of as being a valuable late kind; and Stone's Apple, a local Kentish variety, is reported as being a sort that well deserves more extensive cultivation than it has hitherto received. Worcester Pearmain, a beautiful Apple, is also stated to be good."

Mr Ralph Carr Ellison, who writes interestingly on woodcraft in the 'Journal of Forestry,' makes some remarks on the subject of pruning that may interest your readers. He says:—

"Let every large branch that is to come off be cut twice and in two places, first a good yard or more above the place where the true amputation is to be made. This in order to get rid of weight, and to prevent rending and splitting near to the stem of the tree. The final cut of any limb, branch, or branchlet should be made just above or outside of the ring-swell or encircling protuberance of bark and wood which surrounds its butt, and so as to leave the ring-swell untouched by the saw. The only instruments that should be used to insure protection of the ring-swell, when a branch is to be amputated, are the saw, the chisel and mallet, and the pocket-knife. All axes, hatchets, bills, and billhooks should be disallowed, after Pontey's excellent advice,—for no workman, however dexterous, can be trusted with an edge instrument to be used by striking. The axe is admirable for felling timber, the adze for dressing it when felled, the light axe and hatchet for 'snedding' small wood or cutting coppice, but none of them are suitable for pruning. It is perfectly true that the hardihood of our native trees enables them to live through a great deal of hard usage and deplorable tree-surgery, in the way of slicing and scarifying; but the moment you apply the same freaks to tenderer subjects—to Peach and Plum trees, to the finer varieties of Apple and Pear—you meet with your reward in the sudden decline and death of the wounded stem and all its cherished developments in the second or third year, if not in the first, after the audacious operation of cutting away the ring-swell of some considerable branch."

Perhaps the horticultural reader will agree with us that Mr Ellison rather exaggerates the evil of "cutting away the ring-swell" in the case of fruit-trees. If we are not mistaken, the rule is more honoured in the breach than in the observance, and is not so much as noticed by authorities on fruit culture. To leave the ring-swell of some "considerable branch" would, in the case of some stone fruits, be to leave a knob or protuberance which, decaying, would be very apt to produce gumming, whereas if cut clean away it would heal over perfectly. In the same journal we notice an experienced forester, writing on the same subject, takes no account of the "ring-swell," but gives directions for cutting branches off close to the trunk. Mr Carr writes pleasantly and instructively "on the functions of the lower branches of trees," but we are afraid sometimes hypothetically as well. Speaking on this topic, he tells us that "the wisdom in nature is never at rest till it has done something to shade or to shield the

long trunk from sunshine, wind, and evaporation. Cut away these lovely descending curtains, and Nature will clothe the trunk with grey lichens on the windy-side, and with green mosses on the leeward. Scrape off these too, and she will bid the hapless tree bear flower and seed in reckless and exhausting profusion while yet it has strength to do so. It will scatter its seed upon the winds, to propagate its kind far and wide ; and then it will gradually decline upon your hands, and fall a prey to canker or to fungus, to lightning or to tempest."

Mr Ellison verges on nonsense here. "Nature" does not do the things he tells—at all events, with the object Mr Ellison believes and tries to make others believe. In the first place, she produces lichens on trees in situations where they are not required to protect the tree from either wind or sunshine—that is, in the densest and most sheltered parts of the forest, and where it is moistest ; and, secondly, she, as a rule, refuses to produce them where they should be most needed, one would think—that is, upon trees in exposed situations ; and lastly, it is difficult to see how a clothing of moss or lichen is going to shelter a tree from wind and prevent it being blown down, just as it is to understand the connection between the scraping off of the lichen and the moss, and the consequent destruction of the tree by "lightning or tempest."

A correspondent of a contemporary, and a gardener, who hails from the Land's End direction, where witchcraft and superstition still survive, as one frequently sees by the papers, states that he "plants out forced Strawberries after the balls of earth are pummelled as hard as bricks, and tramps the ground firmly about them after they are planted," and asks why newly-planted young Vines "should not be treated in the same way." It may be answered that there is at present no law for the protection of employers who happen to have gardeners who entertain such notions ; but in the meantime, probably, a few cheap copies of Thomson's book on 'The Vine' might be gratuitously, and with great advantage, circulated in the locality from which the above inquiry emanates. "Pummelling" pot-Strawberries and pot-Vines "as hard as bricks," and planting both out in a soil "pummelled" to the same consistency, is an idea that must entertain Grape-growers in the north hugely.

· READER.



THE RIPENING OF WINTER-FLOWERING PLANTS.

THE rainfall of the past summer, and the thick clouds in which the sun has been enveloped for the greater part of the season, have left gardeners with a legacy on their hands to make up by artificial conditions the deficiencies of a cold sunless summer before the short days of winter are upon us.

After such a prolonged season of cold and wet, the autumn may yet come in fine ; and if our hopes should be realised, and the heavy clouds should disappear only for a short season, the opportunity must not be lost to assist nature artificially to make a climate which will complete and consolidate the growth of plants. Shade, with its attendant consequences on plants, whether it be from the absence of sun and light, or whether the latter be excluded by artificial means, permanently or in part, forms a feature in practical gardening which is of more importance

than many people would suppose, notwithstanding the part it plays in the ultimate return that plants will yield in the way of flowers. The present season has been a most difficult one to manage in this respect, owing to the soft nature of the growth that most plants of a succulent tendency have made, both out of doors and under glass. The rough-and-ready makeshift of shading glass with lime, which has to answer in ordinary seasons, is a practice that, this year, will not commend itself to the observation of those who understand the influence that solar heat and light have upon plants. On the one hand, shade is indispensable even to plants that in ordinary seasons do not require it; and, on the other, the shade should be of the thinnest possible texture compatible with safety to the plants, and be used only for a short time during the hottest part of the day.

Plants that are planted out for the summer are the worst to manage this season, owing to their growth being retarded by the inclement weather in the early part of the year, and which is consequently soft, and will require skill to perfect and mature it. This refers to *Salvias*, *Solanums*, *Eupatoriums*, *Deutzias*, *Bouvardias*, &c.

The cure for these will be to have them lifted early and put under glass in a shaded aspect, and keep them rather close and syringed until the roots begin to work—a process which will only occupy a few days—and then place them in the warmest and brightest position that can be afforded them under glass, full in the sun, and set them thin enough apart for air to play about them on all sides. It is possible that, under the changed conditions, the plants will require a little extra attention, especially if the days are bright; but they will gradually become hardened, and with a partial cessation of root-growth, the tissues of the shoots will soon “fill up firm,” and turn hard to the feel.

Of course the tops of *Solanums* will have been pinched out, so that the flow of sap will have been directed to the formation and swelling of the berries, and other plants will have been treated according to their several requirements.

We have a capital example of the advantages of growing plants under glass in a season like the present, in two sets of *Deutzias*, which looked dead in the beginning of last May. The plants were cut down right to the bottom, and plunged in bottom-heat, which was increased as symptoms of active growth appeared, and continued till the shoots had grown to their full length and changed to a sort of greenish-white, which is the first indication that growth is complete, and that atmospheric conditions must be altered. These plants were exposed by stages, and are now plunged full in the sun in the open air, and are as brown as hazel; whilst their neighbours, cut down at the same time, and planted in a south border, are as green as Leeks.

The general body of plants for winter flowering will need more than ordinary care this autumn in order to prepare them for the winter; for although they may look quite green and fresh now, their soft leaves will

not stand long when the days arrive at their shortest, unless they are well exposed to air and light, and the natural warmth of the autumn assisted with fire-heat.

It may also be expected, as an unpleasant contingency, that plants, like other things, will flower late this autumn, so that the gardener had better prepare himself for the emergency by anticipating events.

In the autumn there are Chrysanthemums which are grown by the hundred in many gardens, but which are considered objectionable as cut flowers in not a few places. There is, however, variety enough in a good collection to make a fine show in the conservatory, without drawing much upon other resources; and this compensates for the disfavour in which they are sometimes held as cut flowers.

Taking a rough glance at the prospect of cut flowers for early winter, we have forced Roman Hyacinths, the old white Azalea indica, and old plants of Bouvardias, in scarlet and white, which are indispensable subjects in every garden.

Old plants of the latter are decidedly preferable to young ones for autumn flowering, and should be kept growing up to about the beginning of October, not in a strong heat, but in an aspect where the wood will not turn hard, but continue to furnish an abundance of shoots, which in turn will supply quantities of flowers of transcendent merit for all purposes of decoration. A batch or so of Zonale Pelargoniums (old plants) brought into heat about the same time will supply scarlet flowers until Poinsettias and Plumbagos come in; and a batch of spring-struck Pelargoniums will continue to flower up to February, if kept in a cosy little house near the glass, and well supplied with liquid manure and plenty of fresh air. Eucharis amazonica, for supplying winter flowers, should be chosen from the largest bulbs which have finished their growth about the end of September, and be kept barely on the move until the beginning of November, and plunged in a sharp bottom-heat, when every bulb, according to its size and development, will throw up a spike bearing from five to seven flowers. A few plants of Imantophyllum miniatum treated in the same way will make a most effective companion for the Eucharis. Large plants of Gardenias that were cut back and pinched at two or three different times through the summer, with a view of securing a succession of blooms for the next six months, should be kept moving steadily; and young plants propagated this season, and intended for flowering early next summer, should (if their buds are not already set) be kept on the dry side at a mean temperature of 60°, so that they may set their flower-buds and progress satisfactorily for the purposes for which they are intended. Little plants of Torenia Fournieri, pegged down to about 6 inches high, make handsome little bushes for vases, or front rows for stands; and small plants of Clerodendron fragrans are useful for the same purpose. A batch of Begonia Fraetelli, raised from seed this season, are now coming in useful, their deep glossy leaves and bright flowers being attractive

little subjects for mixed groups, say in company with small Maiden-hair Ferns and *Caladium argyrites* brought forward for winter decoration. Harrison's Musk, propagated late in the summer, and pegged over the surface of 6-inch pots, are handsome objects for covering the surface of large pot-plants when the growth hangs over the sides of the pots, and for front lines in small conservatories they are not surpassed. A batch of *Tuberoses*, when they are in stock, will help to make handsome button-holes, and are in great request for balls and parties in the absence of *Gardenias*. They require an intermediate temperature on the dry side, and in foggy weather make sure of a dry atmosphere by keeping the ventilators closed. Late *Celosias* will require to be kept near the glass in a light situation; their feathery sprays will be found invaluable six weeks hence for arranging with other plants and flowers. *Heliotropes* propagated in the beginning of the summer should now be fine bushes. The last pinching will have been performed about the end of August, and the plants being grown in the shade, will need to be gradually exposed and be brought into flower in a moderate warmth about November. These, with a bunch of *Violets*, a spray of *Mignonette*, and a single *Eucharis*, will make nice little bouquets for small glasses in bedrooms. *Dendrobium nobile* that have changed to the colour of a sovereign will stand in a cool greenhouse full in the sun, and finish the ripening process better than if kept in heat. Keep the plants dry at the root when they are in a low temperature, but see that the growths do not shrivel.

Linum irigynum is better than ever we have had it, from cuttings sent us last June. The plants have been shaded from what little strong blinks of sun we have had, and have been kept growing up to the present date—September 9. The plants are free from spider, and are quite green. This is one plant that the dull weather has accommodated; but it too will require to be hardened and solidified before the winter.

Flowering *Begonias*, *Justicias*, *Eranthemums*, and all such plants with soft leaf-growth, will have to be well hardened by "making a long autumn" with artificial heat and warm air, and what little sunshine we can reasonably hope for before winter. W. HINDS.



THE AMATEUR'S GARDEN.

PEAS AND BEANS.

PEAS for coming in the earliest out of doors are generally sown as soon in the year as the state of the soil will admit; but in late districts, or when the soil is heavy or wet, or both, it is of little use putting the seeds in the soil too early in the season, as they are liable to rot. In favoured localities, especially on light dry soil, Peas are often enough

sown in November, and when the winter proves favourable, they come on in advance of those sown in spring. We do not advise amateurs generally to sow in autumn, as much trouble is necessary to bring them through the winter, and as likely as not the result will be disappointing. However, those who are anxious to have them as early as possible may make one sowing of a hardy sort, such as Sutton's Ring-leader, about the middle of November, and another early in January. Those whose space is limited had better wait until well into February, as the chances are that a full crop will be the result, which is more than can be looked for from earlier sowings. To keep up a succession, we find a good plan is to sow at intervals of a fortnight or three weeks, or, in fact, just as one sowing makes its appearance we sow another, in quantities according to the requirements of the household. In dry summer weather it is a good plan to draw good deep drills and soak them with water before sowing, otherwise the seed may fail to germinate, or germinate unsatisfactorily. In favoured localities it is customary to sow as late as the middle of June for the purpose of prolonging the season as much as possible. These must be regarded merely as chance crops in the great majority of northern gardens; and we do not advise the ordinary amateur to continue sowing after the middle of May—and in very cold late districts, the 1st of May—unless there is plenty of ground and an anxiety to have Peas as late as possible.

A deep loamy soil suits the Pea best; but good crops may be raised in any garden-soil from light sand to heavy clay. They require to be sown on different places yearly, as they will do very badly if sown repeatedly on the same spot, and a proper rotation of crops will enable the grower to do this without any special forethought. The best crops are invariably raised on fresh land, and the best application that can be made on heavily-manured garden ground which has been long under garden cultivation, is fresh virgin loam. Where it is possible to get fresh soil, it is always worth while to dig out trenches 2 feet wide and as many deep, and fill them with it, adding manure if this is necessary. We of course refer to old gardens, where this crop is not always satisfactory. Seasons like the past teach us that Peas often suffer for want of water. In dry soils their growth has been tremendous, while in ordinary seasons they are very often stunted on such soils. To counteract the evil effects of drought as much as possible, we have dug trenches, as if for Celery, and put 6 inches of manure in the bottom, and when filling in the soil have left the centre of the trench low, so that when water was applied the Peas got the benefit of it, instead of its running away somewhere else, as it is apt to do on soil sloping *away* from the rows and trodden water-tight; and the difference between Peas treated so and in the ordinary way, in dry seasons, was very great. Our readers must have noticed, when digging ground on which Peas have grown, that the soil is so dry that

long after the Peas have been removed the soil is still impervious to water. This proves the necessity of floodings of water to the Pea in dry seasons if really good Peas in good quantity be wanted. When this is done, or even if it cannot be done, great benefit will follow a thick mulch of sappy manure by the sides of the rows—or failing that, short grass or anything that will check evaporation.

Peas are sometimes sown in quarters by themselves, but we think it a much more economical plan to sow them in single rows among other vegetables. When this is done, sun and air have freer access to every part of the plants, and the result is a much greater amount of produce from a given length of row. In exposed gardens, when thus sown in rows and securely staked, the rows of Peas assist other crops by means of the shelter they afford. By sowing between other crops there is scarcely any difficulty, in even the smallest garden, in affording them a fresh position, and, therefore, new soil annually. The mistake should not be made—too common among amateurs—of planting other crops to within a foot or so of the rows of the Peas. Three feet from the row of Peas to the nearest row of other vegetables is little enough space, but 6 inches may be subtracted from the windward sides of the rows and added to the leeward side, where the rows are exposed. In our case the rows are all blown eastward. In drawing the drills, stretch the line over the ground and draw them the full breadth of a common draw-hoe, from 2 to 3 inches deep, and scatter the Peas evenly at the rate of 1 lb. of Peas to 30 feet of row of the small kinds, and 36 feet of the larger kinds. When 3 inches high, draw a little earth to them, and stake them with stakes according to the height of the variety, which is generally a foot or so more than that given in catalogues, when treated liberally as we have hinted at.

Beans.—These are generally sown, for a first crop, as soon in the year as possible, and in quantities as required at intervals of three weeks or a month. Our remarks on soil, when speaking of Peas, apply in this case also. There is little or no use planting Beans later than May. Plant them in rows 2 or $2\frac{1}{2}$ feet apart; in heavy soil draw drills and plant the Beans at 3 inches apart and 2 deep; where the soil is light they may be dibbled in with every success.

French or Kidney Beans require very different treatment. A sheltered spot with a good south or south-western aspect is usually afforded those, more especially in northern districts, although on light soils in favourable localities they do very well in the open quarters. In seasons like this they have not done well anywhere, and in exceptionally favourable seasons they might do well everywhere; but the prudent grower will afford them the most favourable spot at command. The small-growing varieties may be sown in drills 2 inches in depth, as much apart, and 2 feet between the rows; the more robust kinds should get 3 feet. If anxious for these as early as possible, the Beans may be planted in 3-inch pots, 2 Beans in a pot, and started and nursed

for a time in a cold frame, and afterwards planted out during a favourable spell of weather towards the end of May, when danger from frost is past. A good time to make the first sowing is about the 1st of May, but only then if the soil is dry and warm—for if cold and wet, they will be apt to rot altogether, or come away very weakly at best,—so much so that those sown a fortnight later under more favourable circumstances will soon surpass them. Should circumstances permit, sow at the beginning of May, at the middle of May, at the end, and the last sowing about the middle of June, when they can be protected from the effects of frost, as the least frost destroys them. Our experience in a somewhat cold late locality tells us that either earlier or later sowings are, even in the best of seasons, unprofitable, and in ordinary seasons quite useless.

Scarlet-Runners require treatment precisely similar, only, they grow to a great height, and so require to be staked in the manner of Peas. The scarlet blossoms are very ornamental, and for this reason they are often used for training on cottage walls or over any unsightly object; and as they grow rapidly in ordinary seasons, they are well suited for such purposes, besides yielding a profusion of pods exceedingly useful for the kitchen. All leguminous plants, commonly used as food, are distinguished by their extreme nutritiousness. GARDENER.



NOTES ON DECORATIVE GREENHOUSE PLANTS.

THE CINERARIA.

As a decorative plant either for house or greenhouse, or for cutting from, few plants can surpass the Cineraria. The variety and colours of the best strains of it are very beautiful, and as the time and labour expended in the cultivation of them must be the same, whether the plants turn out to be good varieties or otherwise, it is worth taking some pains to secure a good strain. For general decorative work it is best to raise the plant from seed, as there is less trouble with them, and they almost always show the largest heads of bloom. In order to have a succession of flowers, a pinch of seed should be sown twice in the year. The first sowing should be made early in February in a well-drained pan. Sow the seed thinly, and cover with a piece of glass in order to afford the necessary shade and closeness, until the seed begins to vegetate. Allow a little air as soon as it is well braided, so as to harden the young seedlings. As soon as they are large enough to handle, prick them out singly into thumb-pots, and plunge them in a box of leaf-mould, sawdust, or cocoa-nut fibre, in order to keep them at a proper degree of moisture and to save repeated waterings. They must be kept at this stage in a temperature of from 55° to 60°. In the course of a few weeks they will require shifting into larger pots,

which may be 48's, or 4-inch pots. The compost should consist of good fibry loam and leaf-mould in equal parts, with sufficient sand to keep all open. They must still be kept in a temperature of not less than 50°, and aired on every favourable opportunity; also kept as near the glass as may be convenient; and an occasional dewing with the syringe will refresh them very much. In the course of six weeks or so, if all has gone well, they will require another shift, this time into the pots they are meant to bloom in, which for ordinary work may be 6-inch or 7-inch pots, unless large specimen plants are desired, when larger pots may be used, or better still, give another shift later on. With due care and judicious feeding, however, almost as good plants may be produced in a 7- or 8-inch pot as in those much larger; and from being more manageable, the smaller sizes are the more desirable. The soil should be a little stronger for this shift, using less leaf-mould, and enrich with some old cow-dung, or a pinch of bone-meal. About the beginning of June the plants should be set in a cold frame or pit, where abundance of air can be given; or if in a frame, a current of air should be allowed to play among the plants, by tilting up the frame and putting a brick under each corner. It may be necessary to shade them slightly for a few hours in the middle of the day, and give a dewing with the syringe in the evenings. Keep a strict watch for green-fly, the great pest of *Cinerarias*, and fumigate with tobacco-smoke on its first appearance. Some kinds of *Cineraria* are more subject to the attacks of green-fly than others. The variety we grow has smooth shiny leaves, not so woolly as some kinds we have seen, and unless through neglect in watering, are seldom troubled with green-fly. There is another form of disease which they are subject to sometimes—viz., the sap exuding from the upper surface of the leaves and stems, and drying in globules, so that the plants look as if they had been sprinkled over with white sand. We cannot tell the cause of this, as we have seen it on plants to all appearance in vigorous health, unless it may have been through the plants having been subjected to too bright sunshine. When the plants have filled their flowering pots with roots, and begin to throw up the flower-spikes, then they may have an occasional watering with liquid manure, say about twice a week.

A second sowing should be made in the first week of June and treated much in the same way, only that as soon as they have been pricked out and established in their small pots, they may be grown on in a cold frame or pit, and shifted as they require it; but as they are to stand over the winter we would not advise larger pots to be used than 6-inch. The first batch of plants will come into bloom in the autumn, the second in spring. By shifting on a few at a time, or by sowing oftener, a succession of bloom may be had all the year over. Where distinct varieties are desired for exhibition or otherwise, they must be propagated by offsets from the old plants. To get these, the

plants, as soon as they have done flowering, should be planted out in rich soil until they throw out shoots round the neck of the plants. A sufficient number of these should be slipped off with a heel, and potted up singly, plunged and shaded till they are rooted, after which they may be subjected to much about the same treatment as described above for seedlings. They never make such strong robust plants as those raised from seed, and consequently will not as a rule require so much pot-room. In the majority of cases, 6-inch pots will be quite large enough to flower them in. There should always in any case be a proportion of plants allowed to flower in 4- or 5-inch pots. These come in very handy sometimes for filling vases, or room decoration, where larger pots are not suitable; and we have seen wonderfully fine heads of bloom produced from pots of this size. There is one fact worth remembering in regard to *Cinerarias* raised from seed, and the same may apply to other subjects as well, and that is, that it is generally the self-coloured flowers which vegetate first and grow strongest in the seed-pan; therefore one should not be in a hurry in throwing away the remainder after pricking out a lot, but also take some of the later-brairded seeds. This has never been more forcibly brought before us than this year, when, out of a large number of plants grown, almost without exception they turned out self-coloured flowers, though many varieties in shades of colour. The seed was saved by ourselves, and all from parti-coloured flowers; the reason being that we took the first of the seedlings ourselves, and a party who got some of the later plants had a large proportion of fancy flowers.

J. G. W.



KALOSANTHES COCCINEA.

It is somewhat remarkable that, during the long period of time that has elapsed since the introduction of this plant, it should have received comparatively little attention from cultivators. A strong proof of this statement may be adduced from the fact that it has seldom been exhibited in a condition evincing either art or care in its culture. It would therefore appear that many are content to follow the old method of allowing it to assume its natural straggling habit, being satisfied with the splendour and fragrance of a few heads of flower as an apology for its long contorted legs. But this is a defect in its treatment as palpably inconsistent with the beauty of the plant as intolerable in the present improved and advanced state of horticulture. Under such a system of culture it can only be appreciated while it is in flower, and must, both before and after, be assigned to a secluded position, on account of its meagre and unsightly appearance. I may here state that it is not vague opinion but practical operation I wish to agitate, my remarks being deduced

from the experience of a cultivator of distinguished repute, formerly gardener at Mill Bank, Edinburgh, whose finest plant, exhibited in Edinburgh, carried 317 heads of flower. In selecting cuttings, such as have three or four shoots started at the apex should be chosen, as in some measure they already present the rudiments of a compact plant. I have found them to root readily out of doors during July and August. After they are well rooted they should be kept in the greenhouse, as in such a position they make considerable progress during winter; and as the plant grows continuously, if it be allowed sufficient pot room, progressive shifting should be attended to, so that no time may be lost. When the shoots have grown about 3 inches, their tops should be pinched off, thus giving an additional number of shoots, which will materially tend to render the plant seemly and promising. The following shoots may be permitted to extend to 4 inches, when the process of topping should be again repeated on all the shoots simultaneously, to induce uniformity by checking its naturally rambling habit. I may here state that as this plant at every stage of its growth is peculiarly susceptible of injury from often repeated saturation, much discrimination as well as caution should be exercised in studying its nature and requirements, and in order to insure satisfactory results, the entire management should be devolved on one individual.

Should the foregoing observations be attended to, by the month of May in the following year it will have assumed a fine green and clothed appearance. It may now be removed to a cold frame as a preparatory step to its being transplanted to the open air in June: for this purpose I prefer a place fully exposed to the sun, and sheltered from the prevailing winds. To guard against contingencies, the branches should be regulated and tied to stakes, as well as provision made for shading in case of strong sun. The compost which seems best adapted for the growth of this plant is fibry loam, well-rotted manure, and leaf-mould, in equal parts with a liberal addition of sand: these being well mixed, but not sifted, should be used at every subsequent transference to a larger pot, taking care at every consecutive shift to secure perfect drainage. I may remark in regard to shifting that the fresh earth should be packed so as to be equally firm with the ball of the plant, in order that uniform solidity may insure the regular absorption of moisture. The newly shifted plant requires less moisture after the first application, and weak liquid manure may be supplied at intervals of two or three weeks. As the accumulating shoots progress, much compunction may be felt in having to pinch off the tops, but if this system is not pertinaciously adhered to, ultimate success cannot be attained. If specimens of 18

inches in diameter be thought large enough, it will be necessary to desist from topping by the end of August, because if shortened after this time, they do not gain sufficient strength to produce large heads of flower the following year. But should plants of 4 feet in diameter, to produce from 300 to 400 heads of flower, be the desideratum, it will be proper to continue topping and shifting occasionally till the end of August in the following year, when the operation should be entirely discontinued. According to the system here detailed, a plant at this stage of its growth should occupy a pot 14 inches in diameter. The branches of the plant extending considerably beyond the rim all round, the lower ones from their own weight having become to some degree pendulous, these appearances render a final shift very requisite. A pot of 18 inches in diameter will hold a sufficient quantity of fresh earth to enable the plant to form strong flower-shoots; and also by potting rather deeper than usual, the pendent branches are supported by being allowed to rest on the surface of the earth, into which they root freely, and become important auxiliaries to the principal roots. The final staking may be delayed till the middle of August, when all the main shoots should be properly supported. As the shoots grow rapidly for some time before they come into flower, the supports should extend a little beyond their tops, so that when the flowers are about to expand they may have the advantage of a tie at the neck: thus secured, they may be removed to the place allotted for them, and whether this be the parterre, veranda, or greenhouse, they will continue in flower for six or seven weeks, emitting a rich fragrance and exhibiting an appearance of beauty that is rarely attainable in any other pot plant. In conclusion, I may remind the readers of 'The Gardener' that the truth of the expression, "All that is very fair is very rare," is never more evident than when applied to the *Kalosanthus coccinea*.

THOMAS REID.

CHESTER.



HARDY FRUITS—OCTOBER.

ATTENTION to gathering of Apples, Pears, and Nuts is now an important matter. The fruit-room, or wherever storage is, should be dry, free from any impurity, and vermin should be thoroughly eradicated, and no means of ingress allowed them. The fruit are not to be taken before the usual indications are perceived—the seeds becoming dark, the stalks parting easily from the tree, and the colour well developed. The fruits should be carefully handled and placed on the shelves, in drawers, or other quarters allotted to the keeping of them. We see such a variety of ways and means adopted to the keeping of fruit. Some of the large growers have them laid in heaps on floors, as some do with potatoes. Other instances are, where each fruit is kept separate from its

fellow, and a current of air kept passing through the house. Where specimens are expected to be kept entirely sound, they may be kept thinly on the shelf ; but this is by no means indispensable. When the fruits have "sweated," the ventilators need be opened very seldom. Frequent examinations of the fruit should be made, to see that none are decaying : where there is one left others will soon follow. There are likely to be many fruits of inferior quality this year, badly ripened, that will not keep. Some kinds will not be ready for gathering till November. All trees on walls should be aided in the ripening process where they are inclined to be late. A new broom swept lightly over walls would take away many loose leaves which obstruct the action of light and air. All late growths should be well trimmed off, and if the tree goes on producing young wood, lift the roots at one side of the tree. Fibres, when formed, are conducive to fruit-tree ripening, and fruit in abundance may then be expected. Now is the time to prepare for next season's supply. Gross, sappy trees may be expected to fail in setting a crop. The root-lifting, as formerly advised, must be a matter of care, as the cutting at random of healthy feeders is a positive evil : only long, rambling, and naked thongs should be cut off, and all fibres placed out flat in genial soil. The whole may be made firm, and finished neatly over the surface.

Planting may be set about without delay. Large holes, in the case of trees isolated, may be formed ; but where plantations are formed thickly, a general trenching may be made, and a layer of brick-rubbish under the trees, about a foot from the surface, and the whole firmly rammed, will do much to save the trees from cankering, and act as an obstruction to tap-roots. Deep planting (unless on exceptionally dry and elevated ground) is to be avoided. First have the necessary soil at hand, and fill the hole with it within 6 inches of the surface ; or in the case of low, damp situations, the roots may be level with the surrounding soil. Place a stake firmly into the ground for Standards (dwarf trees may not require props), and place the stem within a few inches of the stake. Wrap a piece of cloth round the stake, to save the bark of the tree ; and before the ties are put on, place a piece of cloth or leather between the twine and the bark. Make the stem secure to the stake, which should be as tall as the tree. Other systems of staking are practised, as may be seen among the fruit-orchards around us ; but we prefer the former for trees which have no balls of earth at their roots. Leave cutting of newly-planted trees till the end of winter. Instead of choosing large collections of kinds of fruit, it is better to select those which are fruitful and suitable to the district—and they might be planted in quantity. As an example, we have rows of young trees just bearing their first crop of fruit : they were young maidens two years ago. Among a large collection of Apples, we have nearly three-fourths of them Lord Suffield, Stirling Castle, Cellini, Worcestershire Pearmain, Margil, and a few others. These may be expected every year to have plenty of fruit on them. Plantations of Raspberries may have all the old rods cut out, if not already done. The rods for next year's supply should not be crowded. Lift canes for planting in new ground. Gooseberry and Currant cuttings may be taken off, tied in small bundles, according to name, till time allows them to be made. Strawberry runners may be lifted and placed in store-beds, according to name. They make good plantations in spring to give runners for forcing. The beds should be thoroughly cleaned, leaving the plants standing individually, when manure may be placed among them. The roots should be kept entire. M. T.

MARKET-GARDENING IN ESSEX.

THE following brief remarks on market-gardening will, I trust, prove instructive to some of the readers of 'The Gardener,' more especially those who may not have had an opportunity of personally observing the way in which the markets of our great and fast extending metropolis are supplied with vegetables. The greater proportion of the vegetables used in the city or east end of London are grown in Essex, which is fast becoming a complete vegetable garden.

A more generally unfortunate season has seldom, if ever, been experienced, and upon no one does this fall more severely than those who follow agricultural and horticultural pursuits. Although in this immediate vicinity there are few of what are termed market-gardeners, yet nearly or quite all the farmers grow large quantities of the more common kinds of vegetables for London, more especially for the Spitalfields and Borough markets. These vegetable crops are the most expensive, but if the crops, and the prices realised, are good, they are very remunerative, and also prove excellent preparations for the ordinary farm crops. Peas, Runner Beans, and Potatoes are the most extensively grown, but many grow a few acres of Turnips, Carrots, Beet, and Onions, &c. Peas, in particular, are the most generally grown, but have not paid over well lately. This is partly attributed, strange to say, to the slackness of trade in the north, as well as in London, as in prosperous times many truckloads of bags and sieves of Peas are bought up in the London markets and despatched northwards, better prices being the natural consequence. Early Peas are mostly grown, as they generally pay best, and the land being cleared early, gives the opportunity of sowing Turnips, planting Cabbage, Broccoli, &c. Sangster's No. 1 is most commonly sown, but Caractacus will eventually supersede it. Some of the more enterprising have sown William I., and are well pleased with it. For later supplies, Laxton's Supreme, Blue Scimitar, Yorkshire Hero, &c., are sown. The latter is a particularly good variety, being to the farmer what Veitch's Perfection is to the private gardener, and is one of the most, if not the most, useful Pea in cultivation. Peas are sown on heavily manured land in drills about 2 feet 6 inches apart, and of course no stakes are used. The growth is very sturdy, seldom exceeding 2 feet in length, and the produce is generally heavy, and the pod well filled. Next in importance to Peas are Runner Beans: these, too, are sown on land well manured, and in lines about the same distance apart as Peas. They are thinned out to about 18 inches apart; they are not allowed to run, but are kept closely pinched back; and the bloom, thrown well above the foliage, presents a very pretty sight, extending, in some instances, over an unbroken field 15 or more acres in extent. Treated in this way, they are picked from much earlier than in private gardens. This season they commenced picking the first week in August—nearly a month later than last year. The growers experienced very great difficulty in getting a good plant,—the seed rotting in the ground in the first instance, and slugs destroying those that did vegetate. It has also been very difficult to keep them clear of weeds. The large podded varieties are mostly grown, but some of the salesmen, who are also growers, have found the small podded varieties the most profitable, as they fetch better prices, and oftentimes selling when the coarser ones will not, and being smaller, are produced in greater profusion. The farmers, as a rule, sell their crops of Peas and Beans early in the season as they stand, either to the market salesmen or other speculative persons, who in their turn employ gangs consisting of men, women, and children, many of whom come out of towns

"for the season" (one buyer I am acquainted with this season employed 120 pickers), who either work by the day or by measure. Sieves and bags are provided by the salesmen, the charge for which is included in their commission. The best prices for Peas in this district was £12 per acre, and for Runner Beans £15 per acre. The latter is a long price as the season will be short, as, of course, the first severe frost destroys them, and we have already (4th Sept.) had some frosty nights.

Potatoes is another expensive crop, and will, I am afraid, pay very badly, disease being very prevalent, which has caused many to lift and sell early at a rather low figure. Those who fortunately have a good crop of late Potatoes will get good prices for them, but this will fall to the lot of but few. Early Dons, Early Rose, and Shaws are grown for the early supply, these being followed with Victoria and other Regents. Rocks, and Scotch Champion Red Skin, Flourhall, would not sell well last season, but many regret not having planted any this season, as such vigorous varieties only appear capable of withstanding the disease. Sutton's Magnum Bonum will eventually become a popular variety, as with us it is the only variety that has withstood the disease, and this will have the effect of bringing it into prominence. Last winter Turnips of any description realised high prices, as also did Carrots, Leeks, and Onions, being in great demand for soup making (which is more extensively made during cold weather), but as soon as the weather became mild, it did not pay to send them up. Onions are an expensive crop, on account of the cost of seed, the amount of manure, and the hand-work requisite to secure a heavy crop. They kept badly last winter, and probably will be still worse to keep this season, as they are very backward. Where nitrate of soda was used as a manure they are still remarkably green. I have my doubts about their keeping, and shall make inquiries on the subject. Onions are oftentimes sown broadcast, and stand thickly on the ground. During the past winter "green stuff" of every description realised extraordinary high prices, this included much that was really sown for sheep-feed, such as Rape, Turnip-tops, &c. Small Cabbages were sold in the market at one penny a piece, the consumers having to pay threepence for them; and other species of the Brassica tribe realised proportionate high prices. Much that sold readily would not during some seasons pay for the carriage up, and I very much doubt if so great a quantity of stalks and leaves were ever eaten in London before.

Nearer London there are large farms given up entirely to growing vegetables, and it is among these that gardeners can gain the most practical information. The quantity of vegetables grown on a comparative small area is something extraordinary. Rotation of crops is to a certain extent, but not strictly, carried out, neither is it necessary, as they use immense quantities of manure, which is being constantly brought to them by water, railway, and traction engines, not three parts exhausted, as that too often used by private gardeners is, but strong fresh manure only sufficiently decomposed to render it workable. With the help of this the soil can be constantly cropped (and must be too, or it will soon be too rich for anything) and the crops are much stimulated, Cabbages especially coming off very quickly. Failing these heavy supplies of manure, it is absolutely necessary to rotate with such crops as Rye, Turnips, Rape, &c., to be fed on by sheep, and thus to a certain extent restoring the fertility to the soil previously much exhausted by a vegetable crop.

Late Potatoes are frequently planted with the spade between Cabbage; and the earliest Peas I saw this season were dibbled in in a similar position. The Cabbage in this instance evidently affording protection to the growth and

warmth to the root, taking up much moisture, which in other instances proved so disastrous to the Pea crop. Celery often follows Cabbage, and is planted direct from the seed bed into trenches principally prepared by horse power. The sides of the trench is made sloping, and oftentimes are planted with Lettuce or Coleworts. A line of Kidney Beans is sown between the trenches (which are about 4 feet apart) and on each side of these a row of Lettuce. Kidney Beans are grown principally for the large firms of pickle makers, as they wont sell when Runner Beans are plentiful. The best for market purposes is the Negro Longpod, and the Newington Wonder for pickling. For the latter purpose one grower contracts to supply 60 tons of beans, but I very much question his ability to grow them this season. Many more facts and hints might be included, but I have already taken up more room than I anticipated, and will therefore as briefly as possible give a few notes on fruit growing.

Essex is not so much a fruit growing county as is Kent on the opposite side of the Thames, but there are many excellent orchards, and many others are fast being planted. Black Currants and Damson always sell well, the latter if only for making a dye; and the former is perhaps the greatest favourite of any fruit for making into jam. This season, too, a large quantity of Black Currants were exported. As a consequence men "with their wits about them" are planting both extensively, as they don't believe in the chance of the markets being overdone with them. There is a great difference in the varieties of Damson; although apparently alike, some being much more prolific than others. If this was not so, the above mentioned practical men would not go to the expense of having them from near Maidstone in Kent when they could get them so much cheaper nearer home. The same men buy Black Currant bushes rather than lose time by propagating their own, and nurserymen in these districts annually sell large quantities of them. A strong clayey loam appears to suit them best, and on such soil the growers find it necessary to cut back the first year, as they invariably push up plenty of young growth from the stem, and also produce nearly enough fruit the first year to pay for the plant. Gooseberries are usually a good paying crop, most importance being attached to the prices realised for them when picked in a green state. Opinions vary as to the advisability of having long or short stems, some considering the latter less liable to canker; but the fruit is much cleaner on the former, and in this district they do not canker. Strong pithy growth is discarded at propagating time, moderate, well-ripened growth being found to make the best and most productive bushes. The varieties most commonly grown are Whitesmith, Warrington, Crown Bob, and Golden Drop. Bullfinches are kept down with the gun. Red and Black Currants, Gooseberries, Raspberries, and sometimes Strawberries and Asparagus are all grown between the lines of Standard Apples, Pears, &c., and apparently are none the worse in that they are undergrowth. Of course the overhanging trees are not allowed to get very large, and the bushes are kept well thinned out, and, what is of primary importance, receive liberal mulchings of good manure—a proceeding too often neglected in private where fortunately there is a properly arranged fruit quarter. The lines of standard trees are about 18 feet apart, and are planted the same distance apart in the row. Three rows of bushes are planted between these lines, and the intervening spaces between each tree are also planted. The Asparagus is planted also in lines, without any extra preparation, but liberal mulchings are given, and the produce is equal to that grown on expensively prepared beds. Asparagus is a very remunerative crop. Fruit of all descriptions as a

rule sell the most readily if they will do either for cooking or dessert purposes; this applies particularly to Apples and Plums, and as they are usually the most productive, are as a consequence most extensively planted. Some of the most productive Apples are the Keswick and Manx Codlin, Lord Suffield, Hawthornden, Wellington, Warner's King ("a good sauce apple"), Cellini Pippin, Reinette du Canada, Lemon Pippin, Blenheim Orange, King of the Pippins, Cellini, Red Quarrenden, Fearn's Pippin and Cox's Orange Pippin—all of which I have lately seen carrying, for the year, good crops of fruit, many of which are being fast sent into the markets. Of Pears the most prolific this season are the Hazel, Williams' Bon Chrétien, Crassane, Duchesse D'Angoulême, and Beurré Rance. Other varieties grown are Louis Bonne of Jersey, Beurré Diel, Beurré Easter (this seldom produces good fruit on standards and are being fast weeded out), Chaumontel, Hacon's Incomparable, Beurré d'Aremberg, and the Autumn Bergamot. Of Plums the most profitable to grow are the Victoria, Pond's Seedling, Mitchelson's Prince of Wales, Early Rivers, Coe's Golden Drop, Green Gage, and Washington. Of Cherries the Kentish, Morello, Bigarreau, May Duke, and Elton are most commonly grown, and both these and Plums have borne a fair crop this season. Filberts are not much grown in these districts, but would, I am convinced, pay well, especially if they received the same high cultivation as they do in Kent. Strawberries, when well grown, invariably pay well, any soil, providing the subsoil is tolerably cool, appearing to suit them; the grand secret being to get a few varieties that succeed best on any particular soil, sticking to them, and growing extensively. The most successful grower, who in fact makes a speciality of it, grows but three varieties—Alice Maud, British Queen, and Eleanor—and nothing could be better than these. Three miles from this farm neither of the varieties succeed well, but Stirling Castle, President, and Dr Hogg are good substitutes. The former will eventually be replaced by Vicomtesse Hericart de Thury, which is found to be very productive and good for the early supply. Sir J. Paxton sells well, but is of too luxuriant growth to be profitable. The above mentioned grower devotes 30 acres to Strawberry culture, and during the season employs upwards of 100 pickers. The best fruit are carefully packed in punnetts which hold about 1 lb. weight, and these are tightly packed in shallow boxes, and being carefully handled by the railway officials, &c., arrive at the markets in good condition. Packed in this manner I have seen plenty of good fruit come up to the metropolitan markets from Hampshire apparently not much the worse for the journey. The bloom is kept closely pinched off the young Strawberries the first year, the second year they produce the earliest and finest fruit, and the heaviest crop on their third and last year—being then ploughed up as soon as the runners from them are fit for planting.

It is a well-known fact that many gardeners start as nurserymen on their own responsibility, often ending, I am sorry to say, in their being obliged to return to their old occupation, seeing when too late the folly of giving up what was perhaps a comfortable situation for an uncertain livelihood. This being the case, it may not be thought presumptuous in me if I suggest to those who are bent upon being "independent," the advisability of their turning their attention to growing fruit and vegetables for market. What is necessary is a fair amount of capital and a good practical knowledge of their profession, without both of which they had better not attempt it.

W. IGGULDEN.

TUBEROUS BEGONIAS AS BEDDING-PLANTS.

ONE of the many things that will make the summer of 1879 memorable in the experience of gardeners is the comparative, indeed total, failure of many tender plants that in ordinary seasons have done well in flower gardening, after the fashion which has been so popular for the last forty years. Any plants, therefore, that have done anything approaching to "well," in spite of the unprecedented rain, absence of sunshine, and consequent cold which has prevailed this year, are certainly worthy of being noted as plants that will be most likely to give satisfaction in ordinary seasons.

Tuberous Begonias have sprung into a very prominent place as decorative plants in pots under glass. For this purpose they are superb; and from our own experience of the behaviour of some 500 or 600 planted out this wonderful summer in by no means a favoured locality, we do not hesitate to pronounce them superb bedding-plants as well. Through storm and rain and dull weather they have grown and flowered much better than anything except *Violas* and *Harrison's Musk*. The impunity with which they stand long downpours of rain is such as we would not have credited had we not proved it. We do not know of any bedding-plant—not even excepting *Violas*—that sustain less damage from heavy rains; and notwithstanding the coldness of the season, they have grown better than *Geraniums* have done. On the 1st of September they were stiff with frost, and in bending the leaves, ice as thick as a threepenny piece scaled off them, and neither in leaf nor flower did they suffer from it.

For wet localities we consider that they will become invaluable for bedding, and take to some extent the place of *Scarlet Geraniums*. Begonias are so easily raised from seed, that they can be quickly got up,—a pinch of seed sown in heat the last week in January, and forwarded by the usual system of pricking; and if the plants are ultimately potted singly into 4- and 5-inch pots, they can be planted out early in June—strong plants that will make an early display. They like rich soil, and wherever planted this condition should be seen to.

Sedenii is what we consider the best type of a bedding Begonia, and all our seedlings raised from it are of good habit and the most productive of flowers of a telling colour. Consequently we are saving seed carefully from this variety for bedding next season. *Charles Raes* are equally good; and for a deep rich scarlet, *Monarch* must be a good parent.

**NOTES ON THE HOLLYHOCK.**

At the commencement of this year Mr Brotherston gave us an article on the culture of the Hollyhock, and as his experience of this grand old flower was unfortunately the same as that of too many of its cultivators, I thought at the time that a few notes as to what had come

under my own observation might be useful. However, I considered it best, with reference to the disease which of late years has attacked this plant, to postpone any remarks until I had the results of this season before me. The disease, or more properly fungus, first made its appearance with me in the autumn of 1877; but I could not altogether consider it to be imported, seeing that no new plants had been received for three years previously. Of course I had heard alarming accounts of it before this time, but, luckily, never had anything to do with it—not even having seen it until the spring of that year, when, looking over a nurseryman's stock, and having some very fine varieties, I naturally felt rather anxious and very unwilling to consign them to the fire-heap, but at once removed the few leaves on which the disease had shown itself, and continued doing so until they were done blooming. Having a plentiful supply of young plants on which the disease had not shown itself, these were planted out in autumn, and I decided to allow the old diseased ones to remain for another season. A few died out through the winter, but the others pushed away quite strong and healthy like, when, about the middle of July, the enemy made its appearance, this time in much stronger force. However, not being altogether dependent on these plants, I commenced with the old remedy, cutting off the leaves, and by the beginning of September many of them were denuded to such an extent as almost to resemble so many bare stakes with flowers stuck on. Many would naturally suppose, as I did, that this operation was of itself enough to cause death, and that the cure, if not worse, was at all events equally as bad as the disease. There is no doubt it weakens them, but I fed well, and in the end the flowers, although perhaps a little smaller, were as fine as ever they had been before—at least I could detect very little difference; and, in fact, with the exception of a very few, my blooms for exhibition last year were taken from those diseased plants, and the prize ticket proved what they were. Still continuing my experiment, I had them lifted last autumn and transferred to a different position and planted in pits filled with a specially prepared compost, the ground previously having been trenched and manured. The result this year promises to be quite satisfactory, and so far as disease is concerned, not a single speck has yet made its appearance, and the growth is something wonderful, so that I am in hopes that it is possible to prevent the disease spreading, if not altogether to cure it and stamp it out, without sacrificing the plants. Mr Brotherston mentions the fact of the fungus being quite common on the Mallow, and this should be a warning to Hollyhock growers, as it seems to be at home on this plant, and ought to be carefully watched. We have no Mallows nearer than a mile, and on the ground of a different proprietor; but what does Mr B. think of the common Groundsel, which is often entirely covered by a similar fungus, but whether identical with that on the Hollyhock or Mallow, I cannot say.

ROBERT STEVENS.

THE FLOWER-GARDEN.

THE past season has been from beginning to end unsatisfactory in every sense, those flowers which have thriven under the continued attentions of Jupiter Pluvius having been very few indeed. Of these, East Lothian Stocks have been particularly fine with us. Koniga, Cerastium, Polemonium variegatum, and Golden Feather pyrethrum, about complete the number. Violas and Pansies have been failures, with the one exception of "Duchess of Sutherland"—one of Messrs Downie & Laird's introductions—which we find one of the very finest kinds; it is clear light-blue in colour, robust in health, and continuous in its flowering. No better kind has passed through our hands since "Alpha" and "Sovereign" were introduced; and it will take its place beside these as a standard sort. Verbenas have been equally bad, or even worse than Violas, with the exception of *V. venosa*: these have been without flowers, and pretty well without having made any growth. Calceolarias: the few grown have done pretty well; but the ravages the disease makes amongst these causes one to be very chary in using them to any extent. Geraniums have been comparatively innocent of flower, and have caused a sad blank in the arrangements. Lobelias have grown pretty freely. Those who have not got the following sorts would do well to do so: *L. magnifica*, a kind which ought to be well known by this time; *L. Brighton*, a clear blue, dwarf and spreading in habit, a grand kind; *L. defiance*, magenta, in habit perfection, and well worth looking after. These three sorts can be recommended as certain to please. Of *Alternantheras*, the only sorts which have grown are *magnifica* and *amabilis*, both very "much of a muchness." *Iresine Lindenii* has not grown much, and not coloured. Four Grasses worthy of being extensively grown are the upright-growing variety of *Dactylis glomerata variegata*; *Festuca glauca*, a bluish grass, and very attractive; *Phalaris arundinacea*, the old kind known as "the Gardener's Garter;" and the exceedingly pretty *Isolepis gracilis*—for a dividing-line betwixt dwarf and rougher growing plants this cannot be excelled. A line of this, planted with *Ageratum "Her Majesty"* alternately, has attracted attention through its chaste appearance. Dwarf Chrysanthemum Asters have proved very useful this autumn. These are now very rich in colour in some varieties, and have stood the weather a long time.

Prompt attention must now be given to get stock in good condition to pass the winter. If Geraniums, Verbenas, and other plants, which do best propagated as early as possible in the autumn, are now well rooted, they ought to be kept as cool as possible, and left out of doors, or, at least, uncovered by glass as late as possible. If, on the other hand, they are not rooted satisfactorily, they should be one and all placed in a growing temperature at once—from 55° to 60° will do, with ventilation. In such a medium they will soon be rooted, but it

will be necessary to keep them gently on the move throughout the winter, where heat has to be resorted to in order to get them established. All kinds of bedding plants not previously put in to strike, should be got in without delay, in order to get somewhat established before the winter is on us. *Calceolarias* can be left till the end of the month; but *Violas* should be left no later. *Gladioli* should be lifted and ripened in vineries, as there is not the slightest likelihood of their doing so out of doors this season. The soil clinging to the roots should be left, as it keeps the bulbs from getting shrivelled. *Dahlias* should be watched and lifted before being hurt by frost: these have been absolutely without effect this season.

Where spring-flowering plants and bulbs occupy the places of the autumn-flowering plants, it is advisable to get these planted as soon as beds begin to look shabby. The middle of October, generally, is quite as late as this should be deferred. Tulips, Hyacinths, Crocuses, Narcissus, &c., can all be planted at same time, leaving them of course till all the plants are into their places. As a rule, these bulbous flowering-plants should be dotted amongst dwarf-flowering or foliage plants, more especially where the beds are open to inspection throughout the winter. In any case it is best to carpet the ground with green Sedums or mossy Saxifrages. It is, however, a matter to be considered whether it pays to keep a display of spring-flowering and autumn-flowering plants in the same beds: very commonly both are failures, and, at the best, one of the seasons' display is apt to be neglected. There is far too much required in these go-ahead times; and as long as two and two make four it will continue to be an impossibility to obtain more from Nature than she will give.

Phloxes should now be broken up and planted in deeply-trenched rich ground, Carnations finished potting up, Rose cuttings put in to strike on a warm border, and everything prepared for the coming winter.

R. P. BROTHERSTON.



THINNING AND MULCHING ROSES IN AUTUMN.

PERHAPS there is no other branch of nursery business in Great Britain in which there is such a general interest taken as in propagating and cultivating the Rose. Thousands are grown annually, and thousands are killed by those fell destroyers, soil and climate, both of which are seldom found suitable in the same garden. Reference need hardly be made to the soil best adapted to the cultivation of the Rose, but there is one important operation which should receive attention in the early autumn—viz., thinning the shoots something after the way we thin out Raspberry plantations, and expose a limited number of shoots both to sun and light,—and mulching the surface of the beds can hardly be said to be of secondary consideration. In light soils, especially, which

are soon drained of moisture, mulching is of the first importance. Although we must not grumble about moisture this season—we have had enough and to spare—still the operations alluded to are just as necessary this year, on account of the influence that sudden transitions of temperature have upon plants: no roots will venture near the surface where every particle of moisture is licked up by evaporation at short intervals. We must therefore, if we wish to keep roots out of a hungry subsoil, bring them to the surface and feed them there with such rich stimulating manures as are most convenient to hand.

With regard to thinning the shoots, the principle is in no way different from that employed in fruit-growing.

Take a Rose-tree with from a dozen to eighteen shoots in different stages of growth, perhaps with several of the limbs barely alive—these are supported and maintained from the same source as the healthy shoots,—cut away all the weakly portions and diseased limbs early in the autumn, and you take out a new lease of life for the portion of the bush that remains. The work is simply one of concentration. The number of growths being reduced, they shoot along with increased vigour, and form large plump eyes, solid and matured by generous treatment at the root, and thoroughly ripened by the action of the weather.

W. HINDS.



A SUGGESTION.

NOWADAYS, when everything possible is being done to facilitate the acquisition of knowledge by members of any particular craft or profession, I would suggest that concessions should be made in connection with public horticultural societies, by which journeymen would become members on the payment of say one shilling per annum, and be entitled to certain privileges, such as gratis admission to all the Shows, and be allowed to enter as competitors in certain classes for which they would be eligible; and probably, in the case of very flourishing societies, a special class or two could be provided for journeymen and foremen, the latter of which should be entitled to the same privileges as the former on the annual payment of, say, one shilling and sixpence.

This system, if adopted, thrown open, and made known to all the young under-gardeners in the country, would, I am confident, be highly successful, and prove a great advantage not only to Societies but also to young men, whose present interests in horticultural exhibitions would thereby become enhanced, and their professional tastes considerably elevated. In short, I think it would be one of the greatest boons that could possibly be conferred on those young men who are aspiring to fill in a satisfactory manner the positions of, or similar

positions to, those now occupied by the men under whom they serve, and upon whom, indeed, they must depend for their chief source of practical information.

It might be argued that were this suggestion acted upon, a number of anomalies not easily dealt with would arise; but, for my part, I fail to see that any intolerable incongruities could possibly occur that might be detrimental to the interests of the Societies. On the other hand, I firmly believe that the Societies would be strengthened financially, and the present members would be gratified to know that they were encouraging in no mean way that love for the profession which must dwell in the breast of every young gardener who aspires to the attainment of giving satisfaction to those whom he may in future have to serve in the capacity of gardener. At any rate, it would be highly desirable to hear the opinions of more influential men and young gardeners too upon this subject, as I think it worthy of every intelligent gardener's careful consideration. If a society like "The Royal Caledonian Horticultural" were to take the initiative, I am bound to say others would speedily follow. JAMES BOYD.

MOUNTMELVILLE GARDENS.



HEATING BY HOT WATER.

I do not intend to encroach upon your space to discuss further what has been termed the side issues of this question, as they are comparatively unimportant. Mr Hammond differs from me when I say that a house situated above the level of others will be the hottest. He does not think that that proves anything in favour of elevation increasing circulation. It only proves that the hotter water gets there. He also says that "it is not a well-known fact that a house situated above the level of the others in a range is the hottest;" and probably it may not be so in all cases—that may depend a little on the arrangement—but I could point to many practical examples in support of my statement if it were necessary. I may remark that I merely stated that as a practical illustration of the fact that elevation increases circulation, thinking that it was self-evident to all gardeners. But though the practical workings of different apparatus may be disputed as not being uniform, the principle upon which hot water circulates remains unaltered. I will now deal with what Mr Hammond considers the points of practical value at issue on this subject; but first, I may remark that if what Mr Makenzie has already written on the subject, with his numerous quotations from the best authorities, does not convince Mr Hammond that he is in error, I despair of being able to do so. He asks, "Is a continuous rise in the flow from the top of the boiler to the furthest points of extension in the compartments to be

heated essential to rapid circulation?" In answer to this question, I agree with Mr Hammond that it is not essential to circulation, but in my opinion is most convenient in general practice. What I contend is, that *elevation* is essential to rapid circulation, but I differ with him when he says that in place of it being essential the continuous rise is a hindrance to circulation. I hold that it makes not the least difference whether the rise be vertical or gradual, if the height and difference between the mean temperatures or densities of the ascending and descending volumes of water be the same. If Mr Hammond can prove that the circulation will be less rapid under these circumstances, I will submit that a gradual rise hinders circulation; but if he fails to prove that, as I predict he will, then of what avail is all Mr Hammond's talk about an imaginary return current hindering circulation in a gradient rise? [Is it imaginary?—ED.] Lastly, he asks, "Is it necessary or essential to rapid circulation that the top of the boiler should be below the main body of flow and return pipes whether there is only one house to heat or a range of houses?" In answer to that question, I may say that that would depend on the height of the boiler and what Mr Hammond may consider a "rapid circulation." If I understand Mr Hammond to mean what he stated in the February number, that the circulation will be as rapid with the bottom of the boiler one foot below the level of the return as if it were several feet deeper, then I must again differ with him. I maintain that the circulation in hot-water pipes increases in proportion to the difference of weight or pressure between the ascending and descending volumes of water on the *base*. Now this difference of pressure is increased in two ways: by raising the elevation, and also, to a limited extent, by increasing the difference between the mean temperatures of the two volumes of water. Mr Hammond thinks that the circulation will be as rapid with the bottom of the boiler one foot below the level of the return as if it were several feet deeper. Now it is plain that the water before entering the boiler is at its lowest temperature, and consequently at its greatest density. And as it has been already stated that the pressure of a liquid on a given base is measured by the vertical height or depth and density, independent of the shape of the vessel or the quantity of water which it may contain, hence it is evident that the greater the fall before entering at the bottom of the boiler, the greater is the difference of pressure and gain of power to counterbalance the lighter volume in the flow. This will appear more plain when we consider that it is only the ascending and descending volumes, equal to the vertical height, that press on the base, and therefore act on circulation. Now, as an illustration of the fact that elevation increases circulation, we will take for example an apparatus with an elevation of 4 feet: we will suppose the mean temperature of the ascending column of the flow is at the temperature of 98° Fahr., and that of the descending column of the return at 62°; the pressure on the base of the water in the flow

at the temperature of 98° in a 4-inch pipe 4 feet high is approximately equal to 344.72063918 ounces avoirdupois, and that of the return is equal to 348.17828489 oz. The difference between the pressures is 3.45764571 oz. Now suppose we raise the elevation to 8 feet, the pressure of the flow is increased to 689.44127836 oz., and that of the return to 696.35656978 oz. The difference of pressure is 6.91529142. Hence we see that the difference of pressure at 8 feet is double that at 4 feet. But with the same source of heat, circulation would not be doubled, as it is plain that the difference between the mean temperatures of the two volumes becomes less as the rapidity of circulation increases. Thus we see that the rapidity of circulation increases in proportion to the difference of pressure on the base, and that the difference of pressure is increased by elevation. I will not trespass further on your valuable space; but I may say, in conclusion, that though what has been said may not convince Mr Hammond that he is in error, it may help to convince some of your intelligent readers who may have any doubts on the subject.

C. M.

I RECEIVED a few days ago a copy of the August number of 'The Gardener,' and was so interested in the articles it contained on heating by hot water, that I at once procured all the earlier numbers having reference to the subject. Allow me at once to say that I agree with most of the views so clearly expressed by Mr Makenzie, and most especially with that as to the obligation we hot-water engineers should be under to Mr Hammond, *if* he is able to show us a method by which three or more houses can be heated from one boiler without a deep stoke-hole. I presume I am right in confining the discussion within these limits, as it is, I believe, admitted by all engineers that where only one, and occasionally two houses, have to be heated, it is easy to obtain a satisfactory result with the boiler level with, or even above, the pipes. I shall be glad to supplement Mr Makenzie's list of heating apparatus so erected during the last fifteen years.

Mr Hammond wishes, in his last, to confine the discussion to two points. Respecting the first, he gives some reasons why he says no; but I fail to see an explanation in any of his letters as to how more than two compartments or houses can be heated as he proposes, with bottom of boiler only 1 foot below the pipes. He admits that outside paths cannot be crossed, but is silent as to inside paths. Will he kindly answer Mr Makenzie's question, p. 231, as to inside paths?

Glass houses are, or should be, arranged so that plants may be grown successfully, with the greatest economy of labour possible, not to put hot-water apparatus in; and a system which will not admit of doors and paths being placed where required is at once condemned, *even* if the water does circulate the best in that form. Then, again, with a continuous fall from boiler, the placing of pipes under stages

and in other confined places is more awkward, as they fall from the point where they enter the house to the far end, and then continue to fall in the return, thus taking up twice the height compared with pipes that rise to the far end and fall in the return—a fact alone which would often entail great trouble in a long house. It appears to me that Mr Hammond has left out one very important fact in his theory—I say theory, because I find no statement that he has succeeded in heating a range of houses on his plan ; if he has, I shall be only too glad to make the journey north to see the apparatus at work, if he will kindly permit me—and that is, air.

Water, when heated in the boiler, gives off air in greater or less proportions ; and that it continues to do so after it leaves the boiler, or that it at least carries the air with it for some distance, is proved by the fact that, in a large apparatus having air-cocks instead of open air-pipes, air is found to accumulate at all the cocks, even those most distant, and not at that only where it would the most easily go in leaving the boiler. Now the retarding of the circulation by friction is so much greater where the water has to pass under confined air than when passing under the upper surface of pipe, that I have known it stopped on one side of a house where there was a slight inequality (often not a quarter of an inch) in the rise of the pipes, which allowed the air to accumulate ; on removing the inequality, the water at once circulated properly. Yet Mr Hammond advocates an arrangement of pipes in which every particle of air which passes beyond the highest point above the boiler has to fight its way back against the flow of the water to that point before it can escape. Has he ever watched the air under the ice covering a stream ? I have ; and the way in which a large bubble, detached by the stream from air accumulated at a high point, was carried down, struggled part of the way back to be carried down again, until it often took it minutes to regain its place, taught me that it could not be wise to expend the force of the flow of hot water in contending with the inclination of air to reach the highest point. Why not allow the air to go the same way with the water ? He will say, “Why not then let the water rise the whole way until it is about to re-enter the boiler if you are correct ?” I would, if the houses were built for the pipes, and not the pipes for the houses. Careful experiments were made near Derby by a gentleman in heating a large factory where it was possible to arrange the pipes either to rise to the highest point at first or at last ; he tried both, and proved to *his* satisfaction at least, that the circulation was quicker, and that less coal was required to maintain the same heat in the room, with the latter arrangement.

When the hot water leaves a boiler it must be replaced with other water out of the return-pipe, and the quicker it is replaced the quicker will be the circulation. Does Mr Hammond intend to state that water in the return-pipe will fail to fill the vacuum caused in boiler by the

rise of the heated water in the same time, if it have only an inclination of 1 foot in 100, as if it had 10 feet to fall in the same length? If so, all rivers would flow at the same speed. In conclusion, I should be like Mr Makenzie, only too pleased to hear of a system which would give us a quick circulation through a large system of pipes without a deep stoke-hole; but I fail to find any evidence in either the arguments or statements of Mr Hammond to prove that he has made the discovery.

HENRY J. PEARSON.

BEESTON, NOTTS.

I DARESAY both you and most of your readers are heartily tired of this discussion. Although the subject is a most important one, it has been well ventilated, and I think may now be safely left in the hands of those whose business or pleasure lead them to carry into practice the various forms of apparatus recommended.

Allow me very shortly to notice one or two points brought forward in the several communications which appeared in your last. In reply to one statement of Mr Stevens's, in reference to "pressure or gravitation," if he will think the matter out a little further, he will find that this pressure or gravitation—which he evidently thinks has nothing to do with the circulation of the water—has not only to do with it, but is the sole and only cause of the *upward* motion in the flow-pipe. I tried to make this plain in my last, and if I have failed it is not because such is not the case, but because of my inability to put the matter in as clear a light as I should have wished. This same inability to simplify a somewhat abstruse subject is no doubt the cause of Mr Stevens's not comprehending my reference to friction. His remarks about it having been proved by "Albion" and others that a continuous ascent is *not necessary*, are, to say the least of it, misleading. From the very first I admitted that there is no *necessity* for the pipes having a continuous ascent; indeed, I do not recollect that any of your correspondents took up this position,—the opposite is the case. Mr Hammond and some others asserted that a continuous or vertical rise is a hindrance to the circulation, and is the cause of repeated failures in the working of hot-water apparatus. I repeat that I can point to many apparatus, fitted up by my own firm and others, where nearly the whole, as it were, is a return-pipe, while there are others where nearly the whole piping is a flow-pipe, both systems working admirably. There are one or two things in Messrs Hamiltons' letter to which I wish to refer, although I am not particularly alluded to. It must not be concluded that because the houses nearest the boiler heat easiest it establishes any principle. I can conceive several possible explanations of this; and if Messrs Hamilton were to call in a properly-qualified engineer, I have no doubt their apparatus could be made to work quite satisfactorily with very little expense,—at least I know one who would be quite prepared to undertake to do so on the safe principle of "No cure, no pay." If Messrs Hamilton, however, state the quantity of piping correctly at 8500 feet, I beg to point out to them that the "Climax" boiler of Messrs Hartley and Sugden (I presume "Barr and Sugden" is a slip—there is no such firm of boiler-makers), of the largest size—viz., 5 feet—is only given out to heat, *approximately*, 4000 feet; and where there are so many circulations, I certainly would never think of loading them above 2500 each. Any amount of failures, through causes probably never suspected, will never prove that, given two

circulations of hot-water pipes, one 20 feet and the other 4 feet above the boiler (everything else being equal), the lower one should heat first. It must not be supposed for one moment that the "theory" is that, under all circumstances, no matter where placed—no matter how far away, no matter what friction or what boiler power—the highest *must* heat first. This is a mere burlesque on the subject. What is correct in theory must be correct in practice; but theory does not take up a fragment of the subject and forget all the rest.

I observe that Mr Hammond asks if the upper strata in the flow-pipe travels faster than the lower strata. I answer, *it does*. Any one who doubts this I invite to examine for himself by calling on me here, where he will see an apparatus with certain parts of the 4" pipe made *entirely of glass*, showing the motion very plainly at the various points: nothing can be plainer and more convincing.

The only other point of Mr Hammond's letter calling for comment is his quotations from Hood. I am perfectly well aware Hood recommends the form of apparatus advocated by Mr Hammond. What then comes of the assertion that hot-water engineers never recognised the desirability of this form under any circumstances? I asserted in my last letter that, as far as concerned myself, my practice is to be entirely guided by the circumstances of the case. Hood recommends this for diametrically opposite reasons to Mr Hammond's; for, immediately following the quotation from page 169 of the last edition, he says: "This" (the reversal of the circulation) "arises from the extremely rapid motion of the water in vertical pipes, by which means the whole of the heated water passes directly to the highest level, without delivering any to the lower horizontal branches." Mr Hammond asks me if I think Hood and the other authors quoted have reached the "acme of perfection." I answer *no*; but when I find all men of science agreeing upon the existence and operation of certain laws, and when, moreover, their reasoning in support of these appear to myself to be as plain as that "two and two make four," or that "the whole is equal to all the parts," really Mr Hammond must excuse me when I prefer to stick to my own views when in such good company. That I don't follow Hood in his *practical application* in this matter is because I have repeatedly proved to my own satisfaction—and I am quite prepared to prove to the satisfaction of any other person—that where there are several floors of buildings to heat in the manner referred to by Hood, quoted by Mr Hammond, it is not only possible to have a good circulation with the flow and return of about equal length in what may be called the ordinary manner, but as good a circulation may be had with nearly the whole of the piping *a flow pipe*, with a direct and vertical return. I can point to several places, both here in Edinburgh and elsewhere, fitted up with the flow winding through the various flats, then a direct and vertical return to the boiler, and the apparatus—some in operation for ten years—giving the very highest satisfaction, and no such thing as a reversal of the circulation takes place. In these circumstances I think I am quite justified in coming to the conclusion that it is no necessary consequence of a heating apparatus with a winding flow and a vertical return that there should be any reversal or obstruction of the circulation. Whatever may cause this reversal in certain cases, it is clear that it is not this form of the apparatus, or it must of necessity take place in *every case* where the vertical return exists.

In conclusion, allow me again to point out the mistake made by Mr Hammond, as well as others, in assuming that the motive power in a hot-water apparatus is not the pressure of the cold water in the return, but some mysteri-

ous quality imparted to the water by the heat which makes it fly away from the earth. It is an error to suppose that while water at, say, 60° presses downwards towards its centre of gravity, the same water at, say, 212° has any tendency to fly upwards: there is no such tendency: the all-pervading and ever-present law of gravitation applies to all substances in nature in exactly the same way according to their densities, and no substance has the slightest tendency to rise of itself, whatever its temperature.

A cubic foot of water in its solid form, and the same in the form of vapour, is attracted in equal degrees. The law is that "every particle of matter attracts every other particle by a force that decreases as the square of the distance increases, and increases as the square of the distance decreases." I trust no one will think this does not apply to the hot-water apparatus. A proper consideration and understanding of these fundamental laws saves a world of trouble in discussing the matter. What I said about a lighter fluid forcing a heavier uphill really does not need further illustration, but to any doubter I say again, "Come and see." Come and see water at 80° forcing water at 60° uphill. [But why not let the water at 60° go down-hill?—ED.]

Atmospheric air is lighter than water, bulk for bulk, but nevertheless it raises water 34 feet. Atmospheric air is lighter than mercury, but it raises it 13 inches.

I feel highly honoured indeed by the decision of the stoke-hole affair being left in your (Editor's) hands and mine. We have none of us anything to gain by upholding either false theory or practice, and when called upon I shall be delighted to give a fair and unbiassed opinion on the matter.

A. D. MAKENZIE.

2 GROVE TERRACE, EDINBURGH.

[We have devoted so much space to this important question, that we must now close this discussion for the present.—ED.]



HARRISON'S MUSK FOR BEDS.

THIS is a charming plant for pot-culture, and the numbers of it sold in pots are immense, but to see it in its most effective dress it must be seen as a bedding-plant. In brilliancy it eclipses the well-known *Viola Perpetual Yellow*, and that is saying much for it. Treated exactly like *Violas* as to propagation, and being planted in good holding rich soil, its productiveness of bloom is wonderful. All through the past unfavourable season it has been a mass of bloom. No matter if it be battered for days or weeks with rain, two or three hours fair weather restores its brilliancy. It was from seeing it so brilliant at one or two places in England last year, when the weather was hot and dry, that induced us to plant a good many beds of it this year—and nothing in its way could be more satisfactory. Of course, it is all but hardy, if not quite so. At all events, treated just like *Violas* or *Calceolarias*, it will do well; and we are sure that all who want brilliant beds of yellow will not be disappointed if they grow this Musk in good soil. In hungry dry soils it would be well to put a good proportion of rotten manure in the beds. All the *Mimulus* like moist rich soil.

ARRANGEMENT OF VEGETABLES AT ROYAL CALEDONIAN SOCIETY'S SHOW.

WHILST the memory of the Autumn Show of the Royal Caledonian Horticultural Society is still green, it may not be amiss to note a few thoughts which were given birth to whilst inspecting the Exhibition both closely and as a whole from the gallery encircling the Waverley Market. Of primary importance as to the general aspect of the exhibition, were the groups of plants arranged on the floor of the building by the Lawson Seed and Nursery Company, and which certainly constituted the most striking feature in the Exhibition. It is scarcely too much to expect that the other trade firms will at future shows boldly follow and improve on the innovation so successfully initiated by the above-named firm. Following that, it may be hoped that the Staging Committee may see their way to group all plants on the floor, relegating the ugly tables now in use to some auction mart, where a better use may be found for them by some of the buyers. Then there are the vegetables. Could not there be a mode of setting up these brought into use at the shows, somewhat more in keeping with the dignity of the Society? Instead of huddling the several kinds in the collections together into a flat tray-box, would it not be more in keeping with the fruit-tables to stage the vegetables in the same manner. The difference in the get-up of a collection of vegetables, where the different sorts are set up singly in dishes and arranged to the best advantage, is as different, perhaps more so, as would be the *tout ensemble* of a first-class collection of fruit huddled closely together in a tray in the one case and in the other as at present staged. And so also with the classes for particular kinds of vegetables: neatly set up on dishes, the interest in these would be greatly increased. It would also be an advantage were the Council to state in the schedule the number of each particular vegetable required when staged in a collection—as, for instance, two Cauliflowers or four, a brace of Cucumbers or two brace, and so on with other kinds. Whilst writing on these matters, might I be allowed to draw attention to a vegetable greatly slighted by the Society in question? Why is the noble Tuber left out in the cold? Well-grown Potatoes, when shown in collections, say of twelve to twenty-four sorts, form a feature not only of interest but of beauty to a horticultural exhibition. Let us hope that the Council will overlook our humble friend no longer, and that if they do introduce the Potato in its finest form to the notice of the Edinburgh public, there will be a clause to the effect that they be staged, not on rough boards, but with each kind separately set up on dishes.

As the journal you, Mr Editor, conduct, is the best medium by which to approach this subject, it is hoped you will give your editorial adhesion to these remarks.

A MEMBER OF THE R. C. H. S.



POTS FOR STRAWBERRIES.

WHILE your correspondent, Mr Hinds, is writing on Strawberries in 'The Gardener,' I should feel obliged if he would explain to me and others the incomprehensible statement of his in his "calendrical writings" in the 'Gardeners' Chronicle' lately. He says:—

"A correspondent inquires whether I have found in practice that the yield of plants potted into 5-inch pots a fortnight later is better than that to be obtained from 6-inch pots, the plants of which are equally well rooted and ripened. My experience is that the produce of the former is equal in all respects to that of the latter, with this addition, that a good many more plants of the 5-inch size can be put into the same space, thus yielding a larger supply of fruit from any given space. This experiment was tried side by side with others last year, and the results inspected by competent authorities, whole lines of plants being submitted to the test and brought into bearing at the same time."

This we understood, but a little further on, in a sentence quite unconnected with the above, he says: "No size surpasses the 6-inch pot for all round work." What I wish to know is, how he makes this appear, after telling us that "the produce of a 5-inch pot is *equal in all respects* to that of a 6-inch pot," with this addition, that the 5-inch pot "yields a larger supply of fruit from any given space"? We are given to understand that the sorts experimented with by Mr Hinds were his "all round" favourites—viz., Sir C. Napier and Vicomtesse Hericart de Thury; and it puzzles one to understand why he should elect to use the 6-inch pot for "all round work," or most extensively, when he has proved to his own satisfaction, and the satisfaction of "competent authorities," that the 5-inch pot is by far the best, or, in other words, that it surpasses the 6-inch. The use of 5-inch pots means a gain of about 17 plants in every 100, or nearly 340 plants in 2000—the number, I believe, Mr Hinds forces, as he has somewhere stated; and if that alone is not a sufficient proof that the 5-inch pot surpasses the 6-inch for "all round work," I misapprehend the meaning of figures, and the meaning of Mr Hinds's experiments. Mr Hinds's statements simply amount to this—that the 5-inch pot produces nearly 20 per cent more, and equally good fruit, than the 6-inch pot, space for space; but for some unaccountable reason he prefers the latter for general purposes, and recommends as the best.

LEARNER.

FRUIT-CULTURE.

My reply to Mr Hinds on this subject need not be a long one. I am perfectly willing to discuss the matter with him or any one else who is disposed to meet his adversary on fair grounds, and the arguments advanced against him, without evasion; but in the present instance this seems to be more than I may expect, and therefore, so far as I am concerned, these few remarks close the discussion. In my last I charged your correspondent with laying down rules of conduct for his neighbours that he was in the habit of violating with impunity himself, in his calendarial writings, where he has the least provocation for doing so; and also of advocating practices in Strawberry-forcing which, while they were extra expensive and troublesome, had nothing to recommend them, so far as Mr Hinds has yet demonstrated, at least. These two charges he has been unable to refute.

I next contested his wholly unqualified assertion that large and fine leaves upon Vines showed that they were in the "worst possible condition," and indicated "*just the reverse of superior culture*"—furnishing testimony on my side from my own experience, as well as authenticated examples of famous crops of fruit produced in conjunction with foliage of great size and vigour, at Dalkeith and Floors. These examples Mr Hinds says he "fails to see the relevancy of"—and that being so, I have only to say that I despair of making him see the relevancy of any facts, opposed to his own preconceived notions; and I would neither be consulting the patience of your readers nor my own sense of propriety in making the attempt.

J. S., W.



SCOTTISH HORTICULTURAL ASSOCIATION.

At the monthly meeting held in 5 St Andrew Square, Edinburgh, on the 5th ult., Mr Dunn, president, occupied the chair. After the admission and nomination of new members, the secretary read a communication from Mr John Webster, Gordon Castle, on "Raising of Roots of Fruit-trees as a means of inducing Fertility." After adverting to the importance of using every possible means of maintaining the health and vigour of fruit-trees, so as to secure the utmost productiveness, and at the same time the finest quality and flavour, he pointed out that a very frequent cause of sickly trees and poor crops was to be found in the roots penetrating into the cold clayey subsoil, where they were away from the influences of solar heat and the more fertile soil near the surface. As a remedy for this, he recommended the forking up again of the roots towards the surface, the removal of as much of the poor soil as was consistent with the safety of the tree, and the filling in of the necessary quantity of fresh, rich, loamy compost. Several of the members took part in the discussion which followed—the unanimous opinion being in favour of the principles advocated by Mr Webster, which, it was shown, might in many cases be acted upon by practical arboriculturists, and others interested in trees and shrubs. Mr William Pirrie, Leith, next read a paper on "Mushroom-culture," confining

his remarks to the common species, "*Agaricus campestris*," which, he showed, could be successfully grown under a greater variety of circumstances, and these within the reach of most gardeners, than was generally supposed. He strongly advocated their more extended cultivation, not only for private use, but for the market; and suggested that the now disused Scotland Street tunnel in Edinburgh would prove as suitable for the purpose as the celebrated underground caves of Paris. He mentioned that the simplest test to distinguish the edible from the poisonous species was to put salt upon the "gills," which would cause the former immediately to turn black, but would have no such effect upon the latter. In the course of a long and very interesting discussion, one of the speakers alluded to the enormous quantities of Mushrooms annually sent to this country from Paris; that an increased supply at reasonable prices would doubtless create a still greater demand, and that he was assured, from his knowledge of the trade in Edinburgh, there was no more profitable field open for market-gardeners than their culture.

Mr John Cowe next read the conclusion of his paper on "*The Hyacinth*," the first part of which he brought forward at last meeting. He dealt chiefly with the treatment of the plants after removal from the shed in which they had been plunged among leaf-mould, sand, or ashes, after potting: this he recommended should be done so soon as the crowns were about half an inch high; and in this operation great care should be taken to avoid damaging the tips, as the foliage was sure ever afterwards to bear the marks of such damage, seriously affecting their prospects as competition plants. In a few remarks upon the selecting of bulbs most likely to produce fine bloom, Mr Cowe cautioned beginners against laying too much stress upon mere size,—medium-sized solid bulbs, with firm crowns, and not too wide at the base, were, as a general rule, to be preferred.

The customary votes of thanks were unanimously accorded to the authors of the several papers. There was as usual a large number of plants and cut flowers on the table, including trusses of a new fancy *Pelargonium* of a dark colour, but striped and spotted in a peculiar manner with pure white, from Mr William Pirrie, Leith. Mr L. Dow, Saughton, had a fine specimen of the now little-known "*Geranium anemonefolia*," a species introduced many years ago from Maderia, with elegant palmate leaves, and a profusion of small but beautiful pink flowers. And two plants of new seedling *Tropæolums*, both of considerable merit, one named "*Cetywayo*," having very dark flowers, and light, almost golden foliage, will doubtless "come to the front" among bedding-plants. Messrs Dicksons & Co. had a small collection of cut blooms of seedling *Phloxes*; *Matricaria chamomila plena*, a pretty double form of the old-fashioned herb "*Chamomile*;" *Liliums longiflorum* and *Humboldtii* and *Bravoa geminiflora*, a beautiful liliaceous plant from Mexico, with red Pentstemon-like flowers. The plant from which this spike was taken has been growing in the open air during the last two winters without protection.



ROYAL CALEDONIAN HORTICULTURAL SOCIETY.

THE autumn exhibition of this Society was held in the Waverley Market on 10th September. Excepting the great International Shows, this was generally admitted to be the most extensive show of plants and fruits ever held under the auspices of this or any other Society in Scotland. Of course, after a season of unprecedented cold and wet, hardy fruits and all out-door flowers were both a

small show and sadly deficient in size and quality. But this deficiency was amply compensated by the very extensive show of in-door fruit and plants, more especially Grapes, which were staged in great numbers and of first-rate quality generally: indeed, so forcibly does this apply to the show of Grapes, that a place on the prize list was got only by examples of first-rate cultivation. We counted 250 bunches of Grapes on one table, and this did not include any but what were entered in the classes for Grapes exclusively, so that taking the bunches set up in collections, there must have been close on, if not over, 300 bunches exhibited. Pines were neither numerous nor very fine; Peaches were exhibited in splendid condition; and Nectarines, though not so numerous, were good. In the plant department the local nurserymen contributed extensively and well, all furnishing large tables of stove, greenhouse, and hardy plants and flowers. The Lawson Company on this occasion, instead of placing their extensive exhibits in the usual way on tables, set them on the floor of the market-place,—and it must have been apparent to all how much better the exhibition would have looked as a whole, had every plant in the show been arranged in like manner, and how much better the plants individually could be seen and inspected. Placed on the tables, visitors of dwarf stature are confronted chiefly with the pots, especially when a close inspection is attempted. The managers would do well, we are certain, if they made use in some other way of the unsightly tables, and left the exhibitors to arrange their plants on the floor. So long as these hideous leggy tables are used, the shows will be as nearly as possible a repetition of each other, and visitors will get tired with the stereotyped effect; whereas, if the plants were set on the floor, a new design or order of arrangement could be carried out, at least annually, if not for every show, without any extra expense.

In the limits of the space that we can devote to the reporting of the show, we will not be able to either describe or remark on but a limited number of the prize winning exhibits, but before doing so, we will briefly refer to the nurserymen's exhibitions. Beginning at the west end of the market-place, the Lawson Company had a magnificent collection of Conifera and Shrubs, one bank of which formed a semicircular terminus to the exhibition-ground, and in front of which was a large oval clump of smaller specimens, comprising Golden Yews, *Retinosporas*, *Cupressus*, &c., all very effectively arranged and neatly margined with a row of the pretty Golden Box. Besides these two groups, they had two large circles and a crescent-shaped bed of miscellaneous stove and greenhouse plants, including *Crotons*, *Dracænas*, Palms, *Anthuriums*, mixed with *Vallota purpurea*, *Lilium auratum*, *Petunias*, *Pelargoniums*, and a nicely-flowered specimen of *Clianthus Damperii*. This group of beds was very effective, and being below and on a level with the eye, every individual plant could be distinctly seen. Messrs Methven & Sons followed with a table having down its centre tall Tree-Ferns, *Dracænas*, Palms, flanked on each side with all the popular stove fine-foliage plants, intermixed with *Liliums*, *Pelargoniums*, and some good plants of *Todeas* and other Ferns,—in all forming a very effective exhibition. Next came the table of Messrs Downie & Laird, having very tall Palms for the centre of the group, and among fine-foliaged plants on each side were very effectively mixed *Phloxes* in pots, many of them not yet in commerce, stands of spikes of *Phloxes* and *Pentstemons*, *Violas* and *Roses*,—many of the *Pentstemons* and *Violas* being new and very fine sorts. Messrs Ireland & Thomson's table had for its centre large well-coloured *Crotons* and Tree-Ferns; and the table was filled up with all the popular fine-foliage plants, having intermixed with them a few *Orchids*, *Begonias*, *Hydrangea paniculata grandiflora*, *Nepenthes*,

Sarracenias, Gloxineas, &c. The table of Messrs Dicksons & Co. was also centred with tall Tree-Ferns and Palms, and amongst a general assortment of ornamental foliage plants were placed stands of Carnations, Piccotees, Violas, Lilliums, and two boxes of the fine hardy white perennial *Matricaria Chamomilla plena*, a most useful plant for mixed borders, shrubberies, and for cutting. Mr Robertson Munro had a very interesting table of hardy perennial and Alpine plants amounting to about 150 species. This collection served to show—in spite of the large rainfall that has characterised this season—what a bright table can be formed of these hardy plants. A very interesting table was filled from the Royal Botanic Gardens. The group embraced *Dionæas*, *Sarracenias*, *Bertolonias*, curious and pretty *Agaves*, *Nepenthes*, good examples of *Disa grandiflora*, *Cypripediums*, Pepper, Tea, and Coffee plants, &c. This exhibit attracted great attention. A number of large Palms were also sent from the Botanic Gardens.

For the prize offered for collection of twelve dishes of fruit, three exhibitors entered the lists—Mr Johnston of Glamis taking first honour, with a good smooth Cayenne Pine; splendid Muscat of Alexandria, Golden Queen, and Black Hamburg Grapes; Lord Strathmore and Gilbert's improved Victory of Bath Melons; Red Magdalen and Gros Mignon Peaches; and very fine Pitmaston and Dutilly's Nectarines. Mr M'Indoe, Hutton Hall, made an excellent second with a smooth Cayenne Pine; Duke of Buccleuch and Black Hamburg Grapes; Violet Hative, Noblesse, Stirling Castle, and Royal George Peaches; Brunswick Figs, and Mercurus Melon. Mr M'Intyre, the Glen, was third with two Pines; Muscat of Alexandria and Black Hamburg Grapes; Nectarines, Apricots, Figs, Plums, Pears, Cherries, and Apples.

For the best eight dishes of fruit, Pines excluded, Mr M'Indoe came first with Madresfield Court, Forster's Seedling, Black Hamburg, and Golden Champion Grapes; Violet Hative and Alexander Peaches; a Melon, and brown Turkey Figs. Mr Fairgrieve of Dunkeld made a good second with Black Hamburg and Madresfield Court Grapes; Spanish Peaches; Pitmaston Orange Nectarine; Read's Hybrid and a Seedling Melon; and late Duke Cherries. Mr M'Connachie, Cameron House, was third, having Muscat and Alicante Grapes; Golden Perfection and Marquis of Ailsa Melons; Bellegarde Peaches; Pitmaston Nectarines; Apples; and Plums.

For eight bunches of four distinct grapes, Mr Kirk of Ernespie came in first with magnificent examples of Duke of Buccleuch, Black Hamburg, Alicante, and Buckland's Sweetwater. Mr M'Indoe was second with very fine examples of Madresfield Court, magnificent bunches of Duke of Buccleuch, Black Hamburg, and Forster's Seedling. Mr Loudon being placed third with Muscat of Alexandria, Burchardt's Prince, Gros Colman, and Black Hamburg.

For the four bunches (sorts) Mr M'Indoe took the lead, defeating Mr Kirk this time with splendid Duke of Buccleuch, Black Hamburg, magnificently coloured Muscat of Alexandria, and Madresfield Court. Mr Kirk's were Duke of Buccleuch (fine), Black Hamburg, Buckland's Sweetwater, and Madresfield Court. Mr Loudon was third with Black Prince, Madresfield Court, Trebbiano, and Muscat of Alexandria.

For the twelve bunches—six black and six white—Mr M'Indoe was again first with Muscat of Alexandria, Duke of Buccleuch, Madresfield Court, Alnwick Seedling, Black Hamburg, Bowood Muscat, Frankenthal, Barbarossa, Golden Champion, Gros Colman, and Forster's Seedling. Mr M'Intyre was second with six bunches Muscat of Alexandria, Black Prince, and Black Hamburg. Mr Hammond of Brayton being third, having very good Black Hamburg, Alicante, Muscat, and Golden Queen.

For two bunches of Black Hamburg Mr Boyd, Callender Park, Falkirk, was placed first with two faultless bunches. Mr Curror of Eskbank being second with fine examples also.

Mr Boyd staged probably the finest examples of Muscat Hamburg that have ever been exhibited. The several examples of Alnwick Seedling that appeared on this occasion were so fine in appearance that a good impression must have been formed of it by growers. The same may be said of the Duke of Buccleuch, which was in splendid form, without speck or crack, highly finished and numerous, it being included in nearly every important collection of Grapes. The heaviest bunch has dwindled down to 13 lb. 3 oz., and we see no reason to regret it, for we consider mere weight a false standard to work up to. As we publish the prize-list in full, with the name of the proprietors as well as the gardeners, we cannot afford more space for particulars or remarks, excepting to say that we were pleased to see more Heaths among the competition flowering plants. Mr Paterson, Millbank, and others, have very fine examples of autumn flowering Heaths.

The following is the awards of the judges, who were:—Messrs Thomson, Clovenfords; M'Kelvie, Broxmouth; Fleming, Garscube; M'Kenzie, Warriston; Downie, West Coates; Souza, Touche; Findlay, Castlemilk; Mitchell, Cambus Erskine; Beveridge, Mayfield Langstone; Dunn, Dalkeith; Knight, Floors Castle; Fowler, Grange Road.

The exhibition was visited by over 10,000 people, and we would advise the Council to consider the propriety of keeping such grand autumn shows open for two days, if it could be arranged to have the market for that time.

CLASS I.—FRUIT.

Collection of Fruit, twelve sorts.—1, Geo. Johnstone, gr. to Earl of Strathmore, Glamis Castle; 2, Jas. M'Indoe, gr. to T. W. Pease, Esq., Hutton Hall, Gisborough; 3, M. M'Intyre, gr. to C. Tennent, Esq., The Glen, Innerleithen.

Collection of Fruit, eight sorts, excluding Pine Apples.—1, Jas. M'Indoe; 2, P. W. Fairgrieve, gr. to Duchess of Athol, Dunkeld House; 3, Jas. Maconochie, gr. to A. Smollett, Esq., Cameron House.

Eight bunches Grapes, four sorts.—1, A. Kirk, gr. to Mrs M'Kie, Ernespie, Castle Douglas; 2, Jas. M'Indoe; 3, Jas. Loudon, gr. to T. Baines, Esq., The Quinta.

Four bunches Grapes, sorts.—(First Prize by Mr Robert Jamieson, Fruit Merchant, Princes Street.) 1, Jas. M'Indoe; 2, A. Kirk; 3, Jas. Loudon, The Quinta, Chirk.

Twelve bunches Grapes, six black and six white.—1, Jas. M'Indoe; 2, M. M'Intyre; 3, J. Hammond, gr. to Sir W. Lawson, Bt., Brayton Castle.

Two bunches Muscat Alexandria Grapes.—1, Jas. Maconochie; 2, Jas. M'Indoe.

Two bunches Black Hamburg Grapes.—1, J. Boyd, gr. to W. Forbes, Esq., Falkirk; 2, J. Curror, gr. to J. Douglas, Esq., Eskbank.

Two bunches Golden Queen.—1, Jas. M'Indoe; 2, — Ferguson, gr. to A. Usher, Esq., Oswald Road.

One heaviest bunch of Grapes, white.—1, Jas. Dickson, gr. to J. Jardine, Esq., Arkleton; 2, A. Kirk.

One heaviest bunch of Grapes, black.—1, E. Cameron, gr. to T. Welsh, Esq., Moffat; 2, Jas. Dickson.

One bunch Muscat Alexandria Grapes.—1, Jas. Carruthers, gr. to A. B. Fleming, Esq., Hillwood, Corstorphine.

One bunch Venn's Black Muscat Grapes.—1, Jas. Dickson.

One bunch Black Hamburg Grapes.—1, J. Boyd; 2, W. Collins, gr. to F. Ballantyne, Esq., Walkerburn.

One bunch Black Hamburg Grapes for size of berry.—1, P. M'Kellor, gr. to Mr Raffan, Dolisla; 2, Jas. Dickson.

One bunch Black Alicante Grapes.—1, Thos. Lees, North Berwick; 2, A. Gould, gr. to J. White, Esq., Dolphinton.

One bunch Lady Downes Grapes.—1, J. Maule, gr. to Mrs M'Nab, Howood, Renfrew; 2, J. Carruthers.

One bunch finest flavoured white Grapes.—1, G. Greig, gr. to W. Christie, Esq., Craigend Park; 2, J. Brunton, gr. to Sir D. Kinloch, Gilmerton.

One bunch finest flavoured black Grapes.—1, Jas. M'Indoe; 2, Jno. Laing, gr. to R. Cathcart, Esq., Pitcairle.

One bunch black Grapes for finest bloom.—1, J. Maule; 2, P. M'Kellor.

One bunch Gros Colman Grapes.—1, A. Gould; 2, G. M'Lure, gr. to J. Milne, Esq., Trinity Grove.

One bunch Golden Champion Grapes.—1, W. Kay, gr. to Sir Jas. L. Foulis, Millburn Tower; 2, D. Kemp, gr. to Miss Dalrymple, Langlee, Galashiels.

One bunch Duke of Buccleuch Grapes.—1, G. Gordon, gr. to J. M'Intosh, Esq., Teviot Bank.

Best bunch of any Grapes not named in this Schedule.—1, F. Boyd; 2, A. Anderson, gr. to Earl of Stair, Oxenford Castle.

One Queen Pine Apple.—1, J. Paterson, gr. to Jas. Syme, Esq., Millbank; 2, J. Laing.

One Smooth Cayenne Pine Apple.—1, M. M'Intyre; 2, Jas. M'Indoe.

One Melon, green fleshed.—1, E. Tait, gr. to Sir Coutts Lindsay, Colinsburgh; 2, J. Maconochie.

One Melon, scarlet fleshed.—1, A. M'Leod, gr. to Royal Blind Asylum; 2, J. Halliday, gr. to Wemyss Castle.

Twelve Figs.—1, A. Anderson; 2, Jas. Gordon, gr. to Major Wauchope, Niddrie.

Six Apricots.—1, J. Brunton; 2, J. M'Indoe.

Twelve Plums, four sorts, three of each.—1, M. M'Lean, Vinter Park, Kent; 2, J. M'Indoe.

Twelve Peaches.—(First Prize by Boyd, Bayne, & Co., Fruit Merchants, Princes Street.) 1, A. M'Kinnon, gr. to Viscount Melville, Melville Castle; 2, J. Hammond.

Six Nectarines, two sorts.—1, J. Dickson; 2, J. M'Leod, gr. to R. Smith, Esq., Brencham Park, Stirling.

Six Nectarines, grown on open wall.—1, A. Kerr, gr. to A. Hope, Esq., Chapel-on-Leader; 2, J. M'Leod.

Six Jargonelle Pears fit for the table.—1, J. Laing; 2, J. Morrison, gr. to Col. Hamilton, Preston Hall.

Six Pears, two sorts, named, three of each (exclusive of Jargonelle), fit for table.—1, Geo. M'Leod, Westbourne; 2, Jno. M'Leod.

A collection of Baking Apples, six sorts, named, three of each, ripe or unripe.—1, M. M'Lean; 2, R. Gray, The Gardens (Irvine), Killochan.

Six Dessert Apples, fit for the table, two sorts, named, three of each.—1, T. Bowman, gr. to Lord Deas, Pittendreich; 2, A. Kerr.

A Pint of Gooseberries.—1, Jas. Cossar, gr., Champfleure; 2, Jas. Gordon.

A Pint of Red Currants.—1, J. Cossar; 2, G. Forrester (Amateur), Rosehill, Polmont.

A collection of ten sorts of Hardy Fruits.—1, P. W. Fairgrieve; 2, M. M'Intyre.

CLASS II.—GARDENERS AND AMATEURS.

Table of Plants, 30 feet by 5 feet.—1, Jas. Spence, gr. to Jas. Buchanan, Esq., Grange; 2, T. M'Donald, gr. to D. M'Gibbon, Esq., Grange.

Six Stove or Greenhouse Plants, in flower.—1, J. Paterson; 2, J. Hammond.

Three Stove or Greenhouse Plants, in flower.—1, J. Paterson; 2, C. M'Farlane, gr. to D. Anderson, Esq., Mordun.

Two Stove or Greenhouse Plants, in flower.—1, A. Stalker, gr. to Miss Ivory, St Roque; 2, C. M'Farlane.

Two Cape Heaths, of sorts.—1, J. Paterson; 2, J. M'Cormack, gr. to Mrs M'Vicar, Canaan Park.

Two Cape Heaths, pots not exceeding 9 inches.—1, J. Paterson; 2, C. M'Farlane.

Four Foliage Plants.—1, J. Hammond; 2, J. M'Cormack.

Two Foliage Plants, pots not exceeding 9 inches.—1, J. Paterson; 2, S. Graham, gr. to H. Rose, jun., Esq., Blackford Avenue.

Six Plants for Table Decoration, 6 inch pots.—1, R. Ritchin, gr. to R. Houndsworth, Esq., Kilmarnock; 2, W. Low, gr. to J. Paton, Esq., Viewforth, Stirling.

Two Dracænas (colour).—1, J. Hammond; 2, S. Graham.

Two Crotons.—1, J. Hammond; 2, R. M. Reid, gr. to Geo. Bertram, Esq., Ravenswood.

Four Palms.—1, J. Paterson; 2, G. M'Lure; 3, J. Hammond.

One Palm, specimen, excluding Cycads.—1, J. M'Cormack; 2, J. Paterson; 3, T. M'Donald.

Six Exotic Ferns, exclusive of Tree Ferns.—1, A. Paul, 89 Gilmour Place; 2, G. M'Rae, gr. to P. Neill Fraser, Esq., Murrayfield; 3, J. M'Cormack.

Three Exotic Ferns, pots not exceeding 9 inches.—1, A. Findlay, gr. to A. M'Kelvie, Esq., 14 Oswald Terrace; 2, J. Shearer.

Two Todeas.—1, A. Anderson; 2, A. Findlay.

One Adiantum Farleyense.—1, J. M'Cormack; 2, J. Curror.

Four Adiantums, of sorts, excluding Farleyense.—1, T. M'Donald; 2, J. Pearson.

Tree Fern, stem not less than 3 feet.—1, J. Curror.

One Hydrangea.—1, G. H. M'Culloch, gr. to Jas. Lindsay, Esq., Loanhead; 2, J. Shearer.

Two pots or pans Lycopodium, different sorts.—1, G. M'Rae; 2, J. Cossar.

Two Orchids.—1, Dr Paterson, Bridge of Allan; 2, J. Curror.

One Orchid.—1, Dr Paterson; 2, A. Paul.

Two Petunias.—1, G. Lawrie, gr. to A. C. Haldane, Esq., Greenhill House; 2, R. Lawrie, gr. to Prof. Calderwood, Merchiston.

Two pots *Vallota purpurea*.—1, J. Stuart, Corstorphine.

One pot *Vallota purpurea*.—1, J. Foster; 2, R. M. Reid.

One pot *Eucharis amazonica*.—1, J. Paterson; 2, J. Hammond.

Two Fuchsias, of sorts.—1, Jas. Walker; 2, R. Lawrie.

Two Fuchsias, pots not exceeding 8 inches.—1, Jas. Walker; 2, James Martin.

Two Cockscombs.—1, R. Johnstone; 2, W. Tweedie, Portobello.

Two Balsams.—1, Jas. Walker; 2, H. M'Kenzie; 3, W. Kay, Equal Second.

Three Zonale or Bedding Geraniums, sorts, in pots not exceeding 9 inches, in bloom.—1, A. Henderson; 2, Jas. Walker.

Three Variegated Geraniums, of sorts, in bloom.—1, T. M'Donald; 2, R. Lawrie.

Three Bronze Geraniums, of sorts.—1, S. Graham; 2, J. Brown; 3, R. Lawrie.

Three pots *Lilium*, of sorts.—1, A. Paul; 2, J. Walker.

One pot *Lilium auratum*.—1, J. Pater-

son; 2, T. Philips, gr. to Mrs Murray, Merchiston.

Twelve cut Roses, of sorts.—1, A. H. Gray, Eastferry, Dunkeld; 2, Jas. Stuart.

Twelve Gladioli, of sorts.—1, A. Kerr. Six Gladioli, of sorts.—1, W. Paxton; 2, R. Grieve.

Twelve Quilled Asters, of sorts.—1, J. Taylor, Eskbank; 2, A. Kerr.

Twelve *Chrysanthemum* - flowered Asters, of sorts.—1, J. Taylor; 2, R. Ewan.

Six *Phloxes*, of sorts.—1, J. Pearson; 2, J. Walker.

Four *Phloxes*, of sorts.—1, J. Pearson.

Twelve *Dahlia* Blooms, of sorts.—1, Jas. Walker, Rosehall; 2, Jas. Walker.

Six *Dahlia* Blooms, of sorts.—1, J. Pearson; 2, R. Ferguson.

Six *Dahlia* Blooms, of sorts.—1, J. Pearson; 2, J. Walker.

Six Ten Weeks Stocks, six varieties.—1, G. Lawrie; 2, L. Dow.

Four East Lothian Intermediate Stocks, 4 sorts.—1, H. Sime; 2, J. Spence.

Twelve varieties of *Zonale Geraniums*, three trusses of each sort.—1, W. Kay; 2, J. Bald.

Centrepiece of cut Flowers and Foliage for Dinner Table Decoration.—1, Jas. Thom.

One Hand Bouquet.—1, T. Bowman; 2, J. C. Knight, 15 Clarendon Crescent.

One Table Bouquet.—1, G. M'Lure; 2, H. Watson.

CLASS III.—NURSERYMEN.

Twenty-four *Dahlia* Blooms, of sorts.—1, Downie & Laird; 2, D. Montgomery, The Glen Nursery, Cardross.

Twelve Fancy *Dahlia* Blooms, of sorts.—1, Downie & Laird.

CLASS IV.—GARDENERS AND AMATEURS.

Collection of Vegetables, twelve sorts (to be shown in a flat basket 2 feet wide).—1, G. Potter, gr. to W. Laidlaw, Esq., Seacliff, North Berwick; 2, T. Bowman.

Two Cucumbers.—1, H. Sime, Ridge Park, Lanark; 2, J. Morrison.

Four Cauliflowers.—1, T. Bowman; 2, W. Gourlay, Bilston Lodge.

Four Stalks *Celery*.—1, H. Watson; 2, R. Ferguson.

Four Beetroots.—1, R. Ferguson; 2, H. Watson.

Six Leeks.—1, G. Potter; 2, T. Bowman.

Two Savoy's.—1, A. M'Leod; 2, R. Grieve.

Twelve Onions.—1, G. Potter; 2, G. Greig.

Two pots of Parsley.—1, W. H. M'Culloch; 2, W. Gourlay.

Six Lettuce.—1, H. Watson; 2, W. Kay.

Twenty-four "Schoolmaster" Potatoes (Prizes by Mr John Addison, Eastmains, Broxburn).—1, Jas. Kilpatrick, Redhill, Dumfries; 2, Jas Morrison.

Special Award to Mr Hugh Dickson, Belfast, for Roses, £2.

Calendar.

KITCHEN-GARDEN.

Now that one is drawing to the season of "sear and yellow leaf, there is nearly an end of sowing and planting for 1879;" but the present month is one in which the anxious and industrious cultivator can find plenty to keep his energies employed. The weather has for about a year kept up a topic of conversation which will not be readily forgotten. The continued drenchings and low temperature have rendered it a real difficulty in many places to secure the necessary requirements of the gardens. Weedy gardens and nurseries are more common this season than we ever remember them; hoeing has been almost impracticable; and hand-weeding has been attended with the greatest difficulties. But now that we hope to be better served with weather in the season to come, every effort should be made to facilitate all operations in the gardens which may act as aids in the future. Firstly, a thorough clearance of all useless vegetable matter should be made. Every crop, such as Cabbage, Cauliflower, and Lettuce, should be in their places, properly planted in well-prepared land. We use the word "properly," as it is seldom we meet with men of the ordinary class who can plant in a proper form. Sticking the roots in a hole smooth and battered like pitch is a practice by no means rare, and the collars of the plants are made tight in this while the roots dangle loose in the hole. We need not wonder then why plants—"unaccountable"—look starved during winter, and bolt to seed when the season becomes warmer. Planting in wet soil is much safer when done by a trowel, and the soil properly placed to the roots. If the land is very heavy and cold, a small portion of kindly soil placed with the roots would do much to secure a crop by giving a start to the plants and preventing their becoming stunted. We have in our heavy red clay to adopt this practice with all our seeds and plants—without this precaution failure is certain. Still, on our well-trenched land we have little to complain of this untoward season. When making the clearance which we refer to, all refuse should be

wheeled to a heap, where it should be covered with soil, so that it would not be offensive. If ground is ready to be trenched, a quantity of rough vegetation may be turned down; it will act as drainage and not be lost, but act as a slight dressing to the ground. Our practice is to have a heap of garden refuse—keeping back stones and sticks—a mixture of soot, siftings of lime, burnt-wood ashes, turf, refuse from potting-sheds, &c., all put together, and when trenching is done this mixture is wheeled in quantity to the ground and turned down at least a "spit and crumb" below the surface. We are at present (middle of September) wheeling in such material along with some good manure for the main crops of Cabbage. The ground by this means is kept open during the winter, and in spring the roots run freely into this manure, and get away from drought. The Cabbage crop should be planted without delay. If the plants are, however, pricked out, and not becoming crowded, they will take no harm to remain some time as they are, when they can be lifted and carefully planted. We prefer planting doubly thick, and when the plants are large enough for use, every alternate one is cut out; and when the crop is fully grown those which were cut out early will be coming in to succeed them as greens. Thus a large quantity of vegetable produce may be had off a small space. The small Cabbage plants left from planting should be lifted and planted neatly in a sheltered space to stand the winter. They are of great service in the spring season, especially if we have such another winter as last. We knew the use of reserve plants last March and April. Cauliflower should be planted where hand-lights and other protectors are to shelter them: a border sloping to the sun, well broken, on which place the hand-lights about 4 feet between each, and in each light place nine sturdy plants; they can be thinned out in March, and the thinnings transplanted, leaving about five in each light. Cauliflower to be wintered in frames, &c., should be carefully pricked on a border, measuring first by the size of

frame which may be placed over them a month later, but only for protection; coddling for want of air draws them up weakly. Lettuce may be planted in quantity, also Batavian Endive: a good border or ridge in a sheltered position is very desirable: the ground should be rich and well broken. Brown Coss, Hardy Hammersmith, and All the Year Round stand as well as any kinds we know. All young plantations should be well hoed, and dustings of soot, ashes, and lime strewn over the ground among the plants. Celery should all be gone over, and have a good earthing up; dustings of lime to keep grubs and snails in check are very necessary in some gardens. Endive should now be blanched by placing a quantity in a frame or pit, and covering the glass to keep out light: wooden shutters answer well for such purposes, but tying may be resorted to: laying a board over the plants, or slates placed flatly on them, are often successfully used for blanching. Chicory may be lifted and trimmed for blanching; in any dark, close place it will blanch: a Mushroom-house answers well: a quantity taken in every few weeks will keep up a good supply. Spinach should have all yellow leaves taken off, weeds pulled, and the hoe put through the crop neatly: lime and fine ashes may be dusted all over the surface of the ground. Turnips must be thinned by a careful hand at this

season, only separating the plants and clearing off the weeds: a finely broken surface with hoe is advantageous to growth. Broccoli growing too vigorous may be lifted and laid with the heads to the north, if checking luxuriant growth is necessary. All such crops for winter and spring supply should be gone over with hoe or fork—later it may not be suitable from wet. Ground for Peas and broad Beans may be prepared; thorough trenching is advantageous. Break the surface well, so that the seed may be sown on it, and the soil drawn over. All roots may be lifted and carefully housed, Potatoes especially. There need be no hurry with Beet and Carrots till the end of the month. Parsnips are dug up as they may be wanted fresh from the ground: they retain their flavour and keep better when left in the earth. The forcing of French Beans may be proceeded with. To have plenty about Christmas they should be started this month in quantity, either in pots or planted in pits or frames. Asparagus, where wanted early, may be lifted and placed on a gentle hotbed as thickly as the roots can be laid out, with the crowns clear, and covered with a few inches of light soil. Seakale may also be started this month; a close heat, about 60°, will bring it forward. Keep successions of Mushrooms on the way by forming beds often.

M. T.

FORCING DEPARTMENT.

Pines.—Such an exceptional season as has been experienced calls for practice of a somewhat exceptional order. In the case of plants intended to fruit early in the year, or, it may be, started into fruit by the end of December, it may be necessary to keep them both drier and warmer than usual to get them into a condition that will insure their starting after being rested awhile. Owing to the very wet and sunless summer, the growth of these plants is very likely to be soft and immature, and a drier and warmer atmosphere will, for the next month, so far rectify the deficiency. Avoid, however, now that the nights are getting long, a higher night temperature than 65°; but keep them dry at the root, and freely ventilate on fine days when they occur. See, however, that the

pots are plunged firmly to the rim, and that their bottoms have a good layer of the plunging material between them and the pipes. Keep a temperature of 70° in houses where fruit are swelling off, and let the bottom-heat range as nearly as possible about 90°. Keep the atmosphere moist, but discontinue syringing overhead, and moisten the collars of the plants and surface of the bed instead. If any crowns have a tendency to grow large, screw the centres out of them with a sharp chisel or similar instrument. See that the soil never gets very dry; just keep it moist, but not wet; and if the tan, or whatever they are plunged in, has shrunk, put on a surfacing up to the rim of the pots. All young-growing stock should now have a lower night heat—65° is sufficiently high. Keep

them moderately moist at the root, and let the air moisture be regulated by the weather and amount of fire-heat required to keep up the heat. Air freely on all calm, mild days, and see that the plants are not standing too thickly together. A score of well-grown sturdy plants will be more satisfactory than thirty attenuated specimens. Suckers recently potted, and that have rooted, should now have full sun and more air, and be kept just damp at the root, but nothing more. Pot more suckers as they become fit. Let ripening fruit have a free circulation of dry warm air about them, and keep them drier now than in summer, as they near maturity.

Grapes.—All Grapes intended to hang through the winter should be ripe by the 1st of October; but it is to be feared, started at the usual period, they may be behind time this year. If so, let them be more freely fired, and keep up a circulation of dry warm air about them till they are quite ripe. If any lateral growths have been left on the Vines, they had better now be removed, leaving only one or two leaves to each. Look over all Grapes that have been ripe for some time, and remove any shrivelled or mouldy berries as soon as they present themselves. Keep everything about the vinery dry; and on days when the ventilators can be freely opened without admitting damp, put some heat into the pipes early in the day, allowing them to cool before night. All Vines from which the Grapes have recently been cut will, after so wet and sunless a summer, be the better for special treatment in the way of extra fire-heat and a circulation of dry warm air about them. If any superfluous laterals exist, remove them, so that light and air can play freely about the foliage and wood. Vines planted this year, and that have made strong wood, should also be treated in this way, so as to make sure of being well ripened. All Vines from which Grapes are expected next April and May should be pruned immediately, and all about them and the vinery put in proper trim for a start by-and-by. Pot Vines intended to be forced to yield ripe Grapes in April and May should, by the beginning of this month, be thoroughly ripe. But owing to the sunlessness of the season, many of these may not be so ripe as

they should be, in which case they should be placed in a light position, where, by means of fire-heat, they can be subject to a circulation of dry warm air for a few weeks. It is better to do this, and start them a fortnight later than usual, than to begin with them in an imperfectly ripened condition. Where new borders for planting Vines next spring have to be made, it would be well to store the soil for them in some place where it can be kept dry, and be in good condition for putting into the borders in early spring.

Peaches.—Apply fire-heat to all strong-growing trees till the wood is well ripened. Look over trees from which fruit has been recently gathered, and remove all superfluous shoots, so as to let light and air play about all the foliage and wood. Should this month be colder and damper than usual, late Peaches under glass will be benefited by fire-heat: it will cause them to swell better and improve the flavour. Where new borders are to be made and young trees planted, the work should be done so that the trees may be planted just as they begin to shed their leaves. Any young trees that have made strong unfruitful shoots should be lifted and replanted at the same time. Keep the earliest trees cool and well aired.

Melons.—Late crops should have the night temperature about 72°, and when ripening, warmth and dryness are indispensable to good flavour; but avoid allowing the soil to become so dry that the foliage flags before the fruit are perfected.

Cucumbers.—Keep up a genial growing atmosphere, not allowing the heat to sink below 70° or rise above 75° at night. Less moisture will be required in the soil and atmosphere as the days shorten and the sun loses power. At the same time, the plants must be supplied with sufficient to keep them fresh and in a growing condition. Thin out all growths that are crowding the trellis—leaving, of course, the youngest: stop them at every joint, and do not over-crop.

Figs.—Keep trees from which the fruit are all gathered drier at the root, and, provided the wood is well ripened, keep them cool; but young strong-growing trees should be kept warm till they ripen properly. Remove all growths not required for properly fur-

nishing the trees with fruit-bearing wood. Keep a circulation of dry warm air in houses where fruits are ripening.

Strawberries in Pots.—If former directions have been carried out, these should now have their pots thoroughly filled with roots, and have large well-developed crowns. But the season having been most unfavourable for

the production of fine plants, it may, in many localities, be desirable to place at least some portion of the stock in cold pits or frames, where they can be kept near the glass and have plenty of air. This would materially assist late plants in maturing their growth. Remove all runners as soon as they show themselves.



Notices to Correspondents.

All business communications and all Advertisements should be addressed to the Publishers, and communications for insertion in 'The Gardener' to David Thomson, Drumlanrig Gardens, Thornhill, Dumfriesshire. It will further oblige if all matter intended for publication, and questions to be replied to, be received by the 14th of the month, and written on *one side* of the paper only. It is also requested that writers forward their name and address, not for publication unless they wish it, but for the sake of that mutual confidence which should exist between the Editor and those who address him. We decline noticing *any* communication which is not accompanied with name and address of writer.

W. M.—*Dionæa muscipula*, we find, thrives well in equal proportions of peat, sphagnum, and broken potsherd or charcoal. Drain the pots well. Place the plants in a temperature intermediate between stove and greenhouse heat. It does very well in the moist atmosphere of the cool orchid-house.

W. S.—You have overcropped your young Vines, hence the smallness and bad colour of the fruit. Buckland's Sweetwater is a free-bearing, easily-grown Grape, but scarcely fourth-rate in flavour. Were your case our own, we would substitute the Duke of Buccleuch for it.

A. S.—Follow the directions given for *Hibiscus Cooperii*.

M. W. C.—The small thread-like worms are not wire-worms. Any application likely to destroy the worms would be apt to injure the Strawberries. You might, however, try the effect of watering with clear lime-water, and apply a dressing of quicklime to the surface, and fork it in between the rows.

T. B.—Gumming is frequently caused by bruises, if it is gumming of trees you mean. If of the fruit, the cold, wet, sunless season is the most likely cause.

THE GARDENER

NOVEMBER 1879.

SEEDLING HEATHS AT BOTHWELL CASTLE.



FOR many years—half a century at least—Bothwell Castle has been justly celebrated for a collection of well-managed Cape Heaths. For the last decade or two this beautiful genera of plants has generally been too much neglected, and their cultivation has not extended or kept pace with that of other more ephemeral plants that are easily and rapidly grown, and more available for the tear and wear of ordinary decorative purposes. This, we think, is to be regretted. At Bothwell Castle, Heaths have been steadily adhered to; and any one who had the pleasure of seeing the collection there in bloom last August and September will, we think, agree with us in saying that it is a pity Heaths are not more extensively patronised. The Heath-house at Bothwell—an elegant span-roofed structure—was at the time we name a perfect blaze of bloom, with the most select varieties of the more difficult to manage hard-wooded Heaths in splendid specimens.

In saying this we are assuredly recording what must be regarded as one of the greatest triumphs of gardening skill. To grow and maintain in robust health for a series of years a collection of large and symmetrical hard-wooded Heaths is, in itself, one of the highest achievements a gardener can accomplish. Not only has this been done by Mr Turnbull, but almost every one of the noble specimens that he has grown for the last fifty years have been his own cuttings, —a practice not at all common among Heath growers. It is considered such slow work to grow Heaths from the rootless cuttings, that they are generally bought from the nurseries. Nor is this but a fraction of the credit that is due to Mr Turnbull. Not less than thirty-two of

the finest varieties that compose this celebrated collection of Heaths are seedlings of his own raising, all being the result of the most careful and intelligent hybridising, carried on for half a century. These grand seedlings are the very cream of hundreds of seedlings which have been carefully proved, and none saved except such as were decided improvements on their progenitors. Among them are crosses of the third and fourth generations of Mr Turnbull's own seedlings.

It is about fifty years since Mr Turnbull began crossing and raising seedlings, and one cannot form any conception of the slow patient work which he has with such enthusiasm and intelligence carried on, or can fully estimate the splendid results of such a labour. We do not know in the annals of horticulture of a more meritorious achievement in connection with any family or genera of plants, and we question if there be such an one; for it must be admitted that few if any genera of plants demand such patient work and skill to so vastly improve them as do hard-wooded Heaths. These Bothwell Seedling Heaths are truly splendid varieties. Who that has ever seen a healthy well-bloomed plant of Marnockiana, to say nothing of others, needs to be told this? The variety named is not equalled by any other for beauty of colouring and freeness of flowering. Mr Turnbull had many grand plants of it in bloom at the time of our visit, one specimen of which we measured and found it to be 5 feet in diameter and 4 feet high—a perfect sheet of bloom. We will just refer to a few of the thirty-two seedlings retained in the collection. A plant of Turnbullii, another splendid one, was 4 feet by 3 feet. Lady Mary Scott, a variety of the Aitoniana strain, was nearly 3 feet by $2\frac{1}{2}$ feet, covered with a sheet of its pure white blossoms, the tubes of which were $1\frac{1}{2}$ inch long, and the corolla fully an inch in diameter. This is a grand Heath. Then there are large plants of Turnbullii superba; Austiniana, a well-known and splendid Heath; Douglasii; Aitoniana Turnbullii; Lord Douglas; Lady Home, a most superb variety, the result of a cross of Turnbullii with Marnockiana, which cross could scarcely result in anything else than a superb progeny. One plant of her Ladyship we measured, and found it 3 feet by 3 feet. A very distinct and promising variety, as yet unnamed, raised by crossing Eassoniana with Linnaeoides, has a most brilliant tube an inch long, with a pure white corolla. This is one of the few rather soft-wooded varieties Mr Turnbull has selected,—indeed, to the best of our recollection, the only one; and as it was just coming into bloom about the middle of September, it will on that account, as well as from its real beauty, become a most useful late autumn Heath. It is of a free yet sturdy habit of growth. Not to refer further to Jacksonii, simulata, and others, suffice it to say that the whole batch are of the very highest order of merit.

Surely if any kind of labour connected with horticulture deserves public recognition and the highest horticultural honours, it is such work as we have briefly referred to in connection with the Heaths at

Bothwell Castle. Mr Turnbull has, at the same time, not been a man of one idea, for he has not only not neglected any other branch of gardening while he has accomplished such work in Heath culture, but everything connected with his charge for which means have been provided, has been most assiduously and successfully carried on by him during his career of fifty years at Bothwell Castle. We have no recollection of ever having seen finer crops of vegetables in any garden than we saw there last September, and they were just a sample of the usual crops. For many years Mr Turnbull held a foremost place as a crosser and raiser of florist flowers, and the same may be said in reference to general plant culture.

Many a successful gardener owes much to the thorough grounding in all the important principles of culture he received under Mr Turnbull's tuition; and not a few—ourselves among the number—have felt that to follow the lines of gardening practice which he carried out, and the noble example he set in every other respect, was their surest and safest road to success and esteem. Mr Turnbull is one of those gentlemen who have made their avocation a labour of love as well as of duty; and no mind could be further removed from mercenary considerations, one of the strongest proofs of which is the fact that many in his position would have made these grand seedling Heaths a lucrative success, whereas he has never looked upon or made use of his achievement in that way.



ON LATE AUTUMN-FLOWERING HERBACEOUS PLANTS.

THE value of late-flowering hardy flowers is yearly becoming better appreciated. This year, characterised as it has been by its disastrous weather, resulting in a greater dearth of both fruit and flowers than any in the remembrance of the oldest living gardeners, hardy herbaceous plants, and particularly those which flower in autumn, have proved themselves conspicuously superior to the various classes of tender plants which are so generally used for summer and autumn flower-gardening. They have flourished and flowered—most of them out of season, perhaps—in defiance of the adverse weather; and those have had most enjoyment in their gardens who have had the largest number of them employed in their decoration. Doubtless the experience of the present year will stimulate the movement towards the more general culture of the hardy perennial classes of plants, which is one of the healthiest signs of the present time in flower-garden matters. It indicates that the time for an exclusive fashion in the flower-garden, which has long placed a limit to the enjoyment and pleasure of the owners of gardens, is coming to an end, and that the conviction of the superior fitness to our changeable climate of the

many splendid hardy flowers which abound amongst the tribes which make up the great class of herbaceous plants, is being borne in on the minds of all who are interested in flower-gardening.

It is notable that a very large number of the autumn-flowering herbaceous plants, especially those that flower very late, are members of the very extensive natural order *Compositæ*. One genus alone—the Asters or Starworts—furnishes over a hundred species or so-called species, many of them very beautiful, but many also quite unfit for the purposes of decoration, or so little distinct one from another that the cream of the group may be comprised in a very brief list. But a selection of the best of these should be considered indispensable in every garden which it is desired should be replete with flowers to as late a period of the year as it is possible to obtain them in this country. The following are a few of the best of this genus :—

A. amellus.—Pale blue, about 2 feet high, flowering in ordinary seasons from the middle of August to the middle of October.

A. discolor.—White and reddish purple, 18 inches to 2 feet high, neat and compact, and very floriferous ; flowering in August and September.

A. lævis.—Bright blue, about 2 feet high ; flowering in September and October.

A. novæ-angliæ.—One of the finest and most floriferous ; but being a tall grower (4 to 5 feet), it is somewhat troublesome in the matter of staking, yet the immense showy clustered corymbs of large purplish red flowers, lasting for a couple of months on end, render it a most desirable plant for shrubbery or other mixed borders. It begins to flower in September.

A. novi-belgii.—This is similar in stature and general character to the last, and equally desirable. The flowers are deep brilliant blue, and appear in September and October.

A. patens.—This species grows to the height of about 18 inches or 2 feet. The flowers are deep purple,—deeper than those of any other species with which I am acquainted.

A. turbinellus.—Dark purplish blue ; flowers very large, in great many-branched corymbs. It has the same objectionable habit as the fourth and fifth named species, being tall and somewhat weak-kneed.

Among the *Achilleas*, *A. ageratum* is a very fine and showy autumn-flowering species. The flowers are golden yellow, and appear from July to October, according to the nature of the local climate.

A. eupatorium, which usually flowers in July and August, becoming spent generally before September is far advanced, is this year blooming bravely now. By cutting over the stems of *A. Ptarmica* about the end of June, a very late bloom of this most useful and desirable species may be obtained. The small white flowers are indispensable for making up bouquets.

Buphthalmum salicifolium is a very showy autumn flower, not often

met with in private gardens. The flowers are large, golden-yellow, and appear in August, September, and October.

Coreopsis auriculata and *C. lanceolata* are both early autumn flowers, the former often lasting till the end of September or beginning of October. The flowers of both are yellow.

Rudbeckia serotina.—A very striking plant, with very large purplish-red flower-heads; they appear in August and September.

Echinops Ritro.—This is the only species fit for ornamental purposes; but objections would in many cases be raised to its somewhat coarse and Thistle-like foliage, yet the plant is a most striking one, and, when in flower, attractive also. The flower-heads are perfectly globular, almost resembling balls of indigo in colour; they last two or three months.

Galatella hyssopifolia.—A very showy Aster-like plant. It grows about 18 inches high, with a branching corymb of beautiful pale-purple flowers, opening in September and the two following months.

Helianthus multiflorus, *fl. pl.*—A very handsome plant, with large showy orange-yellow flowers, like those of a double *Sunflower* in miniature. It flowers in August, September, and October.

Heleinum autumnale.—A very striking plant, somewhat coarse, yet stately in habit, with large yellow flowers, opening from August to October.

Liatris Pycnostachya.—Flower-heads deep purple, in long close spikes. The plant grows to the height of 2 or 3 feet, one-half the length of stem being flower-spike; the flowers open in August and September.

Linosyris vulgaris.—The flowers are yellow in terminal, much branching, but nearly erect corymbs; the plant about 18 inches high; flowering from August to November.

Stokesia cyanea.—One of the very handsomest of autumn-flowering *Compositæ*, but not early enough to be fully enjoyed except in the most favoured parts of Scotland. The plant is quite hardy, but flowers so late in the season that it becomes spoiled before it fully expands. It is well worthy of culture in pots for conservatory decoration, and, as a matter of fact, has for some years been one of the most favoured plants in Covent Garden Market in autumn and early winter. It grows about 18 inches high, the stems terminating in large deep sky-blue flowers.

Solidago rigida.—The *Solidago*s are a very numerous class, but too much alike in general appearance to present much that is useful from an ornamental point of view. The sort just named is one of the most distinct. It grows erect in a very rigid style to the height of about 3 feet, branching at the top into numerous branched racemose corymbs, the branchlets taking a very horizontal direction from the main stem, which is a very distinctive feature of the species; the flowers, as in nearly every species of *Solidago*, are yellow.

Harpalium rigidum.—This is one of the most showy of autumn flowers. The flowers are very large, deep golden-yellow, with a conspicuous black disc. The plant attains to a height of about 3 feet, and the flowers continue throughout September and October.

Stenactis speciosa.—Blue Aster-like flowers in open corymbs on erect stems, appearing in August and September.

W. SUTHERLAND.

CRAIGLEITH NURSERY, EDINBURGH.

HARDY FRUITS.

THE time has arrived when all planting of fruit-trees should be brought to a close as speedily as possible. Though this may be done, and in some cases extensively, between November and April, it is an established opinion that the sooner the trees are in their places and the roots carefully protected, after the foliage has done its work of maturation, the more healthy they are likely to become. This season's growth has generally been later, and consequently the leaves will hang later; but in most cases there will be every safety in proceeding with the work of planting as early as means will allow. First of all, see that drainage is perfect. Stagnant water is a certain destroyer of the hardiest of fruit-trees. Drains 3 feet deep, and every 25 feet or less apart, may be necessary for low-lying damp orchards. The minor drains should be led into a main one, and that should carry the water right off. Trees in such positions should be kept well above ground-level at time of planting. If the whole ground can be trenched, so much the better. Next to this, large holes should be formed, and at a foot and a half from the surface a quantity of lime, rubbish, and broken bricks may be firmly placed. It is of importance that the roots should grow outwards instead of downwards. At the first they should be placed evenly over the surface of the soil, and covered with good rich loam; and to keep the roots safe during the winter, a coating of litter may be placed over the whole; but when soil is not rich, half-rotten horse-manure will suit well. It is always of importance to induce the roots to grow upwards: this induces fruitfulness, and keeps the trees in good health. Whether trees are planted on walls, espaliers, borders, or in orchards, the treatment of the roots is on the same principle—that of plenty of fibre near the surface, and an absence of those which run downwards, Carrot-like, which keep the trees in gross growth, barrenness, and liable to canker. Root-lifting and pruning are topics which often create some attention at this season. In three contemporaries, views of cultivators are given, all varying more or less; and evidently some views are much opposed to others. One strongly objects to root-cutting during the growing season; another, who

cultivates for market, begins his root-pruning as soon as he sees that wood and leaves are being formed, and an absence of fruit. He is evidently no novice—he secures abundance of fruit, which brings the highest price in market. I have long advocated lifting of roots, and done a fair amount of cutting, but it was always where they could not be lifted up level without bending them so as to cause the growth of suckers; and in no case did I ever see injury from the practice. I always prefer beginning in June or July along with stopping of the wood, so that the roots may become healed up and fibre formed before winter. One writer always lets his roots go, and when they cannot be made to fruit by mulching with manure, he grubs them out and plants young ones. I think few cultivators with a fair share of common-sense would think of carrying out this practice to the letter. We advise giving good wholesome top-dressings to the surface when there are “surface-feeders” to benefit from such; but when roots are growing down into the subsoil, away from sun and air, get them up, and then top-dress to keep them up. Were it not that it might lead non-practical readers astray, we could quote a number of examples where root-pruning has been made short work of and finished in a very summary manner during the growing season,—the spade being the only instrument used for cutting them. One great authority of undoubted success pointed out to us last year the difference of fruit, foliage, and growth of the summer-pruned roots (which were something splendid) to those uncut; but they at the time were being manipulated by spade as if they were as many roots of brushwood doomed to destruction. Market-growers can do what they please with their own, but not so one who cultivates for another. But enough of this for the present: and we would advise young beginners to err on the safe side till experience is gained.

Bushes of Currants and Gooseberries may be lifted and replanted where growth is excessive. The practice is also good in preventing the dying-off of bushes by disease at their collars. The removal of suckers can also be accomplished easily.

If Raspberries are not thinned, they should have attention early, so that the roots left may have every opportunity of ripening. A number best roots may be saved for planting.

Pruning may be done as soon as the leaves are off trees, except Peaches, Nectarines, and Apricots, which might have a light new broom swept upwards over them to take off loose leaves. Shoots which are unripened at the points may have the ends cut off them, which will help to stop their growth.

In orchard-houses the chief of the fruit will be gathered. Any late Plums or Peaches may be kept rather dry till they are cleared of their fruit, then every effort should be made to get the wood ripened; any late growths should be pinched off. Trees planted out may require lifting. This may be done at once. The trees should be turned round

to equalise the growth. When a number are lifted and turned round every year, the stock can be kept equal in size; and they have such masses of fibre at their roots, that abundance of fine fruit is certain, provided the trees are well nourished during their growing and fruiting season. If scale or any other pest have taken quarters on the trees, let them be washed well with soft soap-water heated to 120°.

M. T.

HERBACEOUS BULBS.

IT will be necessary to explain what we mean by herbaceous bulbs. Of course, all bulbs are herbaceous, none are shrubby or woody: all are more or less annual in their parts; at least, the same actual bulb does not flower a second time. Looking at the subject closely, it is difficult to define what a bulb really is. It is easy to realise that a ripe Tulip or Hyacinth is a bulb; so is an Onion or Snowdrop; and a ripe Crocus or Gladiolus may also be pronounced a bulb without challenge. A little further and we get to bulbs of Cyclamens, Gloxinias, Begonias, Turnips, Potatoes, and many other things: then we begin to change our nomenclature, and call them corms, tubers, &c. After all, they are all pretty much of the same character—big buds with a portion of stem attached. The buds on the stem of the Tiger Lily become bulbs when placed underground; and the swollen buds on the Potato haulm become tubers or underground stems, with buds on them, when placed in the ground. The bulb of the Hyacinth differs only from that of the Agapanthus in that it is deciduous, while the other is evergreen, just as the Onion differs from the Leek. Avoiding going further into this maze of distinction without difference, we will explain simply that by herbaceous bulbs we mean for the present all bulbs, whether evergreen or otherwise, of a liliaceous character, which remain, or ought to remain, in the soil all the year round, as distinguished from the ordinary Dutch bulbs with which most people are familiar. One would imagine that flowering bulbs were confined to Hyacinths, Tulips, and Crocuses, judging from the rush there is after those for spring-flowering; just as summer flowers have to the popular mind become associated with Geraniums, forgetting or being ignorant of the fact that there are very many beautiful bulbous plants which flower in company with the Hyacinth, and others which flower when the Hyacinth is asleep. Indeed there is no time of the year, except, perhaps, three of the winter months, in which some of these liliaceous bulbs may not be found in flower; and it is really marvellous, in visiting both public and private gardens, to remark the absence of these old-fashioned bulbs. The discovery of *Lilium auratum* seemed to arouse the public mind to the fact that there was such a thing as a family of Lilies in the world, and so collectors have rummaged up varieties from

all the ends of the earth. At the present time the Hyacinth has a representative in the shape of *Hyacinthus candicans*, yet in bloom, a gaunt-looking but interesting plant. The *Colchicums*, in variety single and double, are now bearing it company, the latter not so common as they might be ; so is the *Belladonna Lily*, where the climate and soil are suitable ; and the more modest *Sternbergia lutea*, as hardy as the *Snowdrop*—the first to close and the other to open the bulb season. The *Belladonna Lily* is specially gorgeous when planted along the front of a vinery or conservatory, in suitable light and peaty soil, and allowed to remain undisturbed like the *Colchicums*. Between the *Sternbergia* and the *Snowdrop* is only three months ; the other nine can be filled up with a succession of these herbaceous bulbs : the *Lilies* alone would fill the gap. But there are many old-fashioned bulbs besides which are nearly forgotten, but which are to be often found in cottage gardens, and gardens which have been neglected, or which have escaped the modern march of improvement. How pleasant it is to see great clumps of *Fritillaria meleagris* coming up in spring where unexpected, growing and flowering anywhere ; or the sturdy *Crown Imperials*, which require, however, to be well established in strong clumps on good soil to flower well.

There are no herbaceous bulbs which surpass the *Narcissus* for hardiness, beauty, or variety,—from the grassy little *Hoop-petticoat*, with its ample flower, to the giant *maximus*, in all shades of yellow and white, single and double. These, as well as the *Polyanthus Narcissus*, annually make stronger and stronger clumps, flower earlier, and, of course, more profusely, if left alone. The *Pheasant Eye*, single and double in variety, are our favourite : as sweet-scented as *Gardenias*, and more beautiful, they are not even surpassed by *Eucharis* or *Phalænopsis* to our taste. Everybody may now have them, as they are being offered by the bushel like *Onions*. The bulbs we have seen this year are unusually large. The double varieties especially require a rich soil and rich top-dressings, and plenty of room to develop themselves. The old *Muscaris botyroides* and *monstrosum*, the *Grape* and *Feather Hyacinth*, are herbaceous bulbs almost forgotten, except in the foresaid cottage or neglected garden. The same may be said of the *Scillas*, except *siberica* and *bifolia*. The *Wood Hyacinths* are showy and cheap ; and though plentiful enough in the woods in some parts, are equally unknown in others and about towns. The *Day Lilies*, of which there are several varieties, all more or less yellow in colour, come in just after the *Narcissus*, and are worthy of cultivation, though very old-fashioned. They cannot be called bulbs, however, being evergreen, their growth being more after the style of the *Agapanthus*—another plant neglected, though hardy, in the south, and everywhere on light soil. Then there are the *Anthericum liliastrum*, and spring and summer *Snowflakes*, and the *Ornithogalums*, most of them native and consequently hardy, that will grow anywhere, even among grass. The whole

of the *Alstroemerias*, which we may class among herbaceous liliaceous bulbs, are of the most showy and lasting character. Some of them are still in flower: the variety of their colour and pencilling rivals the *Gladiolus*. They have all stood the last severe winter on a rather wet border, without the slightest protection. On a warm deep border in the southern counties they are gorgeous. The *Gladiolus* itself, in all its varieties, is best treated just like herbaceous plants. In well-prepared soil they, in a very few years, make large massive stools from single bulbs if let alone. We have a large quantity in a raised bed, with the bulbs very near the surface, which have not been disturbed for years, and the frosts of last winter did not affect them in the least. Now, in the middle of October, they are a profusion of flowers. Their protection was a slight covering of bog earth and snow. There are several of the narrow-leaved small-flowered species or allies of the *Gladiolus* which will be found to be perfectly hardy in well-drained soil, such as the *Watsonias* and *Antholyzas*. The *Tritonias* will sometimes bridge over the winter with protection; but there is no use going into doubtful plants when there are so many perfectly hardy and of equal beauty—as, for instance, the *Tigridias*, Spanish and English Irises, and the whole range of *Liliums*, to the beauty of which the public are sufficiently aroused. There are two of the *Anemones* which we wish specially to mention—namely, *Nemorosa plena* and *apennina*,—the first the double form of the well-known Wood Anemone; the other a plant of precisely the same habit, but with a beautiful blue flower, a little brighter than the common Wood Anemone. There is another class of plants which may be classed among herbaceous plants though not liliaceous, and whose roots are not strictly bulbous—the European *Cyclamens*. The autumn-flowering ones are now gay on the rockery. They do not seem very particular as to soil, and also seem indifferent as to wet or dryness, although stagnant water would certainly kill them. In some parts of the country the native *C. Hederæfolia* is plentiful on dry banks, and for a time are as bright and interesting as the *Primulas*. They are so easily raised from seed that it is surprising they are not sought after for outdoor culture, as the Persian varieties are for the conservatory.

THE SQUIRE'S GARDENER.



THE AMATEUR'S GARDEN.

POTATOES.

THE Potatoe is decidedly the most important vegetable crop grown, and, unfortunately, the most precarious. A moderately heavy loam on a whinstone bottom is the best soil for growing Potatoes to perfection, and a tough clay the worst. Whatever kind of soil we may have at our disposal must be made friable by thorough cultivation to grow them as good as possible. As a rule, garden Potatoes are not half cultivated,

and the produce is generally of an inferior description. Wherever possible, the soil ought to be dug up roughly in autumn or early in winter to allow of its being thoroughly pulverised by the action of the frost ; and a good supply of well-decayed manure added at the same time, unless the soil happens to be very rich, and in that case, a dressing of wood-ashes and soot spread over the surface when the ground is frozen hard in winter, will be much better than ordinary manure. Worms generally abound in rich garden soil, and these cause Potatoes to be scabbed, especially in dry seasons, as they scarify the skin to get at the moisture ; but wood-ashes and soot do much to cause worms to take themselves off, and so the crop comes cleaner, and of better quality, as scabbed Potatoes are generally watery. The addition of rich manure to such soil only aggravates the mischief, and does not add so much to the weight of tubers as to the weight of shaws, which, again, encourages damp and fosters the blight in such dripping seasons as the one we have just passed through. Salt and soot, applied in the same way as recommended for ashes, have proved to be very beneficial in inland positions, more especially in light porous soils from which the saline matter is easily washed by heavy rains. The ash of Potatoes contains $2\frac{1}{2}$ per cent of common salt, and most vegetables as much or more ; and stable-yard manure seldom contains more than 1 per cent, and the rains, as we have said, wash it away easily, so it will at once be seen that salt must be beneficial as a manure in all districts where the rain is free from it. Perhaps the most economical way of applying it is to sprinkle it in the drills at planting-time, and when this is done, fine, large, clean tubers will generally result. Heavy clay will be much improved for this crop if part of it be burnt, along with any inflammable material to hand, and spread over the ground : leaf-mould is also a good dressing for such soils.

Planting ought to be done with the fork, and the soil broken fine during the process. Early sorts should have a sunny dry spot, preferably a south border ; and ample room ought to be afforded them, which is what very few people give. Kidney varieties, and others with dwarf shaws, should not be planted closer than 2 feet between the rows, and 1 foot between the plants ; and on good soil even more should be allowed. Planted closer the result is that there is always a large percentage of small Potatoes of very little use, whereas with room to grow there should be no small Potatoes to speak of if the soil be treated as it should, and the weight from a given piece of ground will be greater. Large growing kinds are planted here at 3 feet between the rows, and 2 feet between the sets, and closer planting we regard as downright waste of garden ground.

It is a great mistake to pick and sow the smallest Potatoes for seed. It pays far better and gives greater satisfaction in the end to pick the best, and were this generally done change of seed would be much less

necessary than it is. Another mistake generally perpetrated by seed growers, is to lift the Potatoes while only half-grown, under the idea that such Potatoes make better seed. There is no exception that we know of to the rule that all seeds, tubers, &c., are better fully matured than half matured; and having made experiments on this point, we maintain that Potatoes cannot be too well matured. We are also well satisfied that, *when good cultivation is given*, changing the seed is a great mistake. When they are badly cultivated the case may be different. The writer grows a collection for exhibition in which he is pretty successful, and he finds that should he require to buy fresh seed of any standard variety it takes him two, and even three, years of good cultivation to bring them up to their proper character. Here are two secrets for would-be successful exhibitors. Keep your Potatoes clean and sound by the use of ashes, salt, and soot, and a finely-broken soil, and get them into character by *not* changing your seed, but by good cultivation, and the selection of your finest tubers annually. It may be objected that we have only written for those who wish to exhibit. Not so. You will find the same principles profitable when growing for the supply of the kitchen. The Potato is easily grown, and so it is never half-grown like every thing else that is easily grown, from Herbaceous border plants to Geraniums and Fuchsias.

Preparing the Seed.—Laying the tubers out in sun to green does no good unless they are half-matured only. Keep them in a dry pit or a cool shed where no frost can reach them, nor yet so warm that they will spring into growth before March. About the end of March lay them in a warm place in a greenhouse, or vinery, or other place, as circumstance may direct, to cause them to spring; and if they are sprung a quarter of an inch by the middle of April, and the soil is in a dry warm condition, they should be cut into sets of not more than two eyes each. Let them lie and dry a little before planting them. Plant in the manner directed, three or four inches deep, in a broad shallow trench, and cover over with fine dry mould. As soon as they are fairly through the ground, go over them with the fork and break up the soil, which will very likely be battered down with the rain, and destroy all weeds, and throw out all sticks and stones in the operation. Repeat this again in three weeks or so, and when the stems are tall enough, earth them up with the draw-hoe. Thin out the stools to two, or at the most three, stems, and leave the strongest. Small weakly shoots only produce small worthless Potatoes, and, by crowding the others, harm them. Perhaps we may be expected to say something on the disease; but we confess we are helpless. Our own are very badly diseased, Magnum Bonum alone standing out; and we do not hesitate to say that this is at present the most valuable Potato which we possess. It is proving to be a splendid cropper. We had it in very good condition in August, kept over from last year's crop; and it stands disease better than any other which we know of: a Potato with a better character

has yet to be raised. Champion, about which we heard so much a year or two ago, will not compare with it on any one desirable quality which a Potato should possess. It is a very strong grower, however, and demands ample room.

Potatoes ought to be lifted and stored, in the way noticed above, whenever the stems decay, from whatever cause—whether ripeness, disease, or frost—as nothing but harm can come to them after the tops are gone, or even going. In the case of those which are attacked with disease, immediate lifting will often save a great number, which would be destroyed were they allowed to stand. The disease commences in the leaves, and does not spread to the tubers quite instantaneously, although it does so, often in a few days.

GARDENER.



ORNAMENTAL TREES AND SHRUBS.

CISTUS (THE ROCK ROSE).

Of the long list of species which compose this genus of beautiful flowering evergreen shrubs, comparatively few have been found sufficiently hardy for open-air cultivation in Britain, and even these require the shelter of a wall to enable them to survive the rigours of our ordinary winters. The great bulk of the sorts are indigenous to the south of Europe, where they are widely distributed; but a few are found in Northern Asia, and on the African shores of the Mediterranean. Most of the species are of free growth in ordinary soils, preferring such as are light and well drained. They are all more or less remarkable for the fugaciousness of their flowers, the corollas in most cases expanding in the morning and falling off at sunset. As others, however, come on in rapid succession and in great abundance, the plants maintain their gay appearance for five or six weeks in summer. This peculiarity is thus prettily alluded to by one of the poets, who says—

“ Yet though the gauzy bells fall fast,
Long ere appears the evening crescent,
Another bloom succeeds the last,
As lovely and as evanescent.”

A resinous gum, which exudes from the leaves and young branches of most of the species, notably from those of *C. ladaniferus*, and known in commerce by the name of “labdanum,” has a pleasant aromatic fragrance, and is used medicinally in a variety of ways, particularly in plasters, and by perfumers in the preparation of cosmetics. This substance is said to have formerly been gathered from the beards of the “goats, whereon it collected while they browsed on the plants.”

It is now, however, collected by a leather comb drawn over the branches, to the teeth of which the juice readily adheres, forming an ever-thickening crust, and is easily scraped off with a knife.

C. ladaniferus (*The Gum Cistus*).—This is an evergreen shrub of about 5 feet in height, indigenous to Spain and Portugal in mountainous districts. It has been cultivated in our gardens since 1629. The leaves are oblong-lanceolate, smooth, dark-green on the upper surface, and slightly hoary below. The flowers are white, with a dark-brownish or crimson spot at the base of each petal, appearing in wonderful profusion in June and July. This is one of the most valuable of our wall shrubs, hardy, and of robust growth in any situation where the soil is dry and moderately rich, and, like all its congeners, remarkably patient under the pruning-knife. As it flowers, however, from the shoots of the previous year, care should always be taken to thin the branches, rather than indiscriminately cutting off all the young wood. The so-called species, "Cyprius," or Island of Cyprus Cistus, differs only from this in its flowers being destitute of the beautiful blotch so attractive in those of the Gum Cistus, and is probably only a variety: it is interesting, however, as a companion plant in collections of wall shrubs.

C. laurifolius (*The Laurel-leaved Cistus*).—A robust evergreen shrub, found naturally over a wide area in Spain and the south of France, where it grows to the height of about 6 feet. It was introduced to our gardens in 1771. The leaves are large, of an ovate-lanceolate form, thick and leathery in texture, smooth dark-green above, and covered on the under surface with a minute down. The flowers, which appear in July and August, are pure white, clothed with prominent red bracts, which are very ornamental just before the flowers expand. This is a very free-growing species, one of the hardiest in cultivation, and very desirable for covering walls. It stands, however, in many districts as a specimen shrub in the open border, when planted in light, well-drained soil.

C. purpureus (*The Purple-flowered Cistus*).—This is a species introduced from the Levant so early as 1659. It is a sub-evergreen, with an erect bushy habit of growth, from 3 to 4 feet in height. The leaves are oblong-lanceolate, prominently veined, undulated at the margins, and of a dark-green colour. The flowers, which are produced in June and July in great abundance, are reddish-purple, with a bright-yellow spot at the base of each petal. The petals are imbricated and crumpled. The young branches are covered with a minute pubescence. Though somewhat tender, even on a sheltered wall, this species deserves a trial in any favourable situation, the abundance and brilliancy of its flowers, and its neat distinct foliage, rendering it quite a feature

in a collection of dwarf wall-plants. A dry, well-drained soil is essential to its wellbeing, and a slight covering during the severest of the winter will in most cases save it from damage.

C. Corbariensis (*The Corbières Cistus*).—A distinct-looking dwarf evergreen, seldom exceeding 3 feet in height. Found wild over a large area in Spain and the south of France, especially on the mountains of Corbières, from whence it is reported as having been sent to this country in 1656. The leaves are of an ovate form, distinctly acuminate, wrinkled on both sides; the margins fringed, of a deep-green colour, and very glutinous. The flowers appear in May and June, generally in remarkable profusion. They are pure white, the margins of the petals tinged with delicate rose. This is one of the hardiest, as well as the most ornamental, of the genus. It is of very free growth, and well worthy of a prominent place among neat, dwarf, wall evergreens.

HUGH FRASER.



NOTES FROM THE PAPERS.

Writing in one of the magazines lately, Mr Anthony Trollope says the most difficult thing that a man has to do is to think. There are many, he tells us, who can never bring themselves really to think at all, but do whatever thinking is done by them in a chance fashion, with no effort, using the faculty which the Lord has given, because they, as it were, cannot help themselves. To think is essential, all will agree, continues this pleasant writer, and that it is difficult most will acknowledge who have tried it. This passage might be studied with advantage by some writers of the horticultural press. No one will deny, we think, that the contributions sent to the gardening papers by the practical section of the fraternity are, for the most part, sound and practical, as well as conscientiously written; but neither can it be denied that some horticultural writers belong to that class which Anthony Trollope says never bring themselves to think at all, or else think in a chance fashion only. When such writers confine themselves to a relation of their practice and its results, they do not err so seriously; it is when they begin to speculate on the causes of things that their lamentable incapacity and unreasoning dogmatism appear. There is no harm in a writer stating his opinions, of course, and he may be excused for being positive in these when he is certain of what he writes; but censure, and, it may be added, pity, only can be extended to a man who, on the strength of his own insufferable conceit and ignorance, attempts to ride rough-shod over his neighbours in matters of practice and opinion. We sometimes laugh at the foibles and conceits of scientific men and *savants*, but, judged by their public speeches and writings, it must be confessed that they are, as a rule, both logical and honest in all that they do,—and that much cannot be said for some writers on horticultural topics. Such men as Darwin, Owen, Huxley, and others, and, we are glad to say, plenty of good horticulturists, exhibit a praiseworthy consistency and honesty in their writings and investigations that might well be imitated by horticultural and arboricultural scribes of doubtful calibre and reputation, whose vanity leads

them to commit errors and absurdities that would make them hide their heads in confusion, could they only "see themselves as others see them." Some writers presume upon their age and experience on some particular line, that has rendered them oblivious to everything else, to scold everybody who differs from them, no matter on what; while others are quite as presumptuous and dogmatic upon even less experience and very slender abilities, either as teachers or practitioners. The miserable sophistry and worse logic displayed in numerous instances is truly pitiable. Very accurate reasoning and clearness of expression is not to be expected from men who have not been trained to think logically and methodically; but it would be more to the credit of those to whom these remarks apply if they would but concentrate their attention in an attempt to tell in an intelligible manner what they do know, and are sure about, instead of dealing in vague generalities and platitudes which serve no purpose and only bring the writer into contempt.

I am pleased to see, Mr Editor, that you have at last got out of hot water. You should really make allowance for the capacities of your readers, and not tax them too severely. In attempting to gather up the threads of the discourse in a sequent manner, our mind was fast approaching a chaotic condition, and we have, perforce, been compelled to discontinue the study. Before we begin again we mean to follow the example of Descartes, and get all former ideas and impressions effaced from our mind, and begin with a clean state. How we have commiserated the Editor over the "copy"! There was a rumour abroad that he had to fly to the solitudes of the Lake district about the most acute period of the discussion, in order to restore his mental equilibrium. If we have been wrongly informed, Mr Editor, we beg your pardon. Now let us see how far on we have got now. For the last twenty years or more these periodical hot-water storms have occurred with the utmost regularity, and scoured every horticultural paper in the land, until the subject now frightens editors about as much as the "*Peronospora infestans*," and the "Resting Spore," *pace* W. G. S. Some twenty years ago, or rather more—for we speak from memory—Mr Thomson of Dalkeith wrote, in the 'Scottish Gardener,' that he could heat something like 500 or 600 feet of 4-inch piping in about an hour and forty minutes, by a moderate-sized retort boiler. In other words, from the time the fire was lit till the heat could be *felt* in the return-pipe close to the boiler, 100 minutes elapsed. The pipes were arranged on various levels in the usual way, and heated numerous divisions. Ye senior and junior hot-water wranglers, have ye accomplished more than this? What is the practical outcome of your hair-splitting disquisitions on hot-water circulation?—a question that has been settled long ago by eminent engineers and others, who at least understand the matter. Discussions on this subject, as in the present instance, have generally been based on the question of sunken stoke-holes, which, it seems taken for granted, must be avoided if possible. But are sunken stoke-holes such an unmixed evil? We know gardens where all the stoke-holes have been kept under ground by special desire. Nor did they cost more than above-ground structures would have done; and what would have been an obnoxious eyesore was abolished.

While on this subject it may be mentioned that means have been discovered whereby petroleum can be burnt effectively under boilers at a cost about equal to coal, but in a way that presents important advantages over the latter. More will likely be heard of the discovery by-and-by, if it accomplishes all that is claimed for it; but as yet we believe it has only been tried under steam-boilers.

This has been a most unfortunate year, so far, for the weather prophets. It

was widely predicted that we were to be nearly frizzled up by scorching heat some time in June or July, whereas we were, on the contrary, nearly drowned and starved. About the same period the lower orders in London and elsewhere were much disquieted by another prediction of our old friend "Mother Shipton"—who is always turning up periodically—to the effect that all the young and the old were to perish off the face of the earth during the present year. Up till the present time the dreadful visitation has not happened, and health statistics lead us to hope we shall escape finally. One of your contemporaries of the daily press tells us: "Many people have concluded that the weather of the past twelve months has been unwholesome so far as the public health is concerned; but this is not so. The metropolitan death-rate has been considerably less than the average, and has not been so low since 1860, when, as now, there was an excessive rainfall. Therefore, although the summer has not been an enjoyable one—indeed it was one in which many classes of the community suffered heavy loss—it was one of the healthiest we have had for nearly twenty years." We are pleased to have something good to say about the weather.

A correspondent of 'The Farmer' asks a very pertinent question: "Why do pot-plants die?" We presume he means those pot-plants that do not die a natural death, or get pitched to the rubbish heap. It is a wide question, and might be answered shortly, that plants die from being kept too hot and too cold, too wet and too dry; from being pruned too much and too little, and from being mismanaged in a number of ways that will readily suggest themselves to gardeners. The question might be discussed, and discussed instructively, for a twelvemonth; and we commend the subject to those who are short of one.

Mr C. P. Pead states, in the 'Journal of Horticulture,' that he has thoroughly proved the fallacy of the assertion that Grapes cannot be grown in the same house with plants. It says a good deal for Mr Pead's ability that he has been able to prove the fallacy of an assertion that we are sure was never made by any gardener worthy of the name. We know a good many gardens, great and small, but none where plants are not grown more or less extensively along with Vines—in plenty of instances all the year round. Gardeners do not approve of the practice, but they are, in the majority of cases, compelled to follow it.

The present time being rather a barren one for the newspapers, they have turned their attention to rural matters, and we extract the following from the 'Globe,' on Bees:—

"It has always been a matter for regret to all thoughtful persons that the keeping of Bees in this country is more systematically neglected than any other industry, and that, in consequence a most valuable gift of nature to man is ruthlessly and persistently wasted. In 1874, when the British Bee-keepers' Association was formed, Mr John Hunter declared that for every hive at present in this country there ought to be a thousand, and that for every pound of honey gathered a ton was lost. But an argument in favour of an industry requires something more than a statement of its advantages to the individual engaged in it and to the community at large. It is also necessary to show clearly that it can be conducted profitably, and here we have no difficulty. According to all authorities, there can be no doubt in the world but that in a good season the profit is large enough to tempt the most usurious, or that in the worst possible year the loss—at the most a few pounds of brown sugar—is so small that the most miserly need not be afraid of the risk. Mr Pettigrew

—the son of the ‘old Bee-man,’ of Carluke, in Lanarkshire—made a profit off the business at the rate of £2, 11s. 8d. per hive per annum on an average of six years; but he was noted as a skilful apiarist, and such a result must not be expected everywhere. Mr Hunter, and other authorities, estimate that the cost of a swarm of English Bees would be about 15s., and the cost of the wear and tear of hives 2s. per annum. For this the return should be at least 25 lb. of honey, value 25s.; 3 lb. or 4 lb. of wax, worth 4s., and a swarm of Bees, worth 15s. Thus the first year’s outlay would be more than returned that year, and in after years £2 per hive profit might be expected. In good years, when two or more swarms turn out, or when the super of 50 lb. or 100 lb. gladdens the eye of the jubilant Bee-keeper, the profits will be correspondingly large. This profit ought to be sufficient to tempt a much larger number of persons to keep Bees than at present do so; and we advise all our readers having a garden, or living near fields, or in rural districts, to see if they cannot add a little to the natural productions of the country by assisting to save that ‘sweetness’ which is at present ‘wasted on the desert air.’ The amount of this waste is enormous. A 20-acre field of grass well sprinkled with the flowers of the white clover will yield 100 lb. of honey per day, and a piece of moorland the same size, with heather in flower, will yield 200 lb. of honey per day, and yet in each case enough will be left to scent the air as well. Pettigrew tells us that in one garden—and not a very large one—he has seen fifty hives standing, the strongest of which has gathered 5 lb. of honey per day, in fine weather, and the weakest 3 lb. There are three classes of persons to whom we would recommend this industry: (1) capitalists; (2) farmers and cottagers and railway servants; and (3) that large body of business men who have ‘a place a little way out.’ We believe that a man with a little capital would find it profitable in the districts of the moors, or of good grass lands, to start colonies of Bees in which the hives number hundreds; and a few such men would find little, if any, difficulty in getting a skilful attendant at a reasonable cost to look after them.”

Recent comments on the subject of Strawberry-culture by the press, induces us to give an extract from a late number of ‘Chambers’s Journal,’ on the Scotch Strawberry-farms in Perthshire. “On the Muir of Blair,” says this journal, “an extensive tract of land lying between Blairgowrie and Coupar-Angus, there is a community of about twenty-five Strawberry-farmers who earn a living for themselves and families at the business of Strawberry-growing. The fruit is usually sold *en masse* to the preservers; and in some years as much as £46 an acre has been realised by the sale; but the average income from a Scottish Strawberry-farm is seldom more than £27 an acre. An acre of Strawberries will sometimes yield the splendid return of £100! Apropos of the Perthshire Strawberry-farms, it was reported two years ago that one of the growers had been offered over £2000 for his lot of twenty-seven acres just as it stood.”

It would almost seem as if the demand for horticultural information was at least equal to the supply when that information is placed within reach of the gardening public at a moderate price. We have now quite a number of weekly and monthly gardening periodicals, not to speak of provincial papers that furnish horticultural information in their pages regularly, and yet there seems room for more. It is stated that the circulation of the penny ‘Gardening Illustrated,’ started only a short time since, is now over 30,000 copies per week, which speaks well for gardening among the lower orders, as well as for the sagacity of the founder of the paper.

READER.

NOTES ON DECORATIVE GREENHOUSE PLANTS.

THE CALCEOLARIA.

No one can but admire a stage or shelf filled with the herbaceous *Calceolaria* when in bloom, and to see a whole house filled with them is a sight not easily forgotten. Even when a few are mixed among other greenhouse plants, visitors are almost sure to take notice of them ; the beauty and brilliancy of their colours, and almost innumerable variety in the markings, render them very choice and desirable objects for greenhouse decoration. They are very easy of cultivation, and are quite within the reach of any one possessing a greenhouse, however small, or even a garden frame. Though young plants can be raised from cuttings, this method is seldom resorted to, unless to perpetuate some particular variety. They are best and easiest raised annually from seed.

The proper time to sow the seed is from the middle to the end of July. The pot or pan should be well drained, and filled up nearly to the rim with a mixture consisting chiefly of leaf-mould and sand, with a little loam added to give consistency. Use the rougher portion of the soil for the bottom of the pot, and finish with some finely sifted soil on the top, after which sprinkle the seed thinly on the surface, and press in gently with a piece of board. No covering of soil is required, the seed being so small. Water through a very fine rose, cover with a piece of glass, and place the pot in a cool place, where it may have a little shade and be out of draught. A little moss may be sprinkled over the glass to afford shade until the young plants begin to show themselves, when the shading should be removed, and a little air admitted by tilting up the glass on one side, and gradually increasing the quantity until the glass be dispensed with altogether.

When the young plants are large enough to handle, they must be pricked out singly into small pots, using the same kind of soil, only having a little more loam added to it. They may be set in a cold pit or frame, and shaded slightly until they get hold of the soil, when the shading may be discontinued, and air given in moderate quantities. See that they do not suffer from want of water, and keep green-fly in check by fumigating. They will require to be shifted into larger pots about the middle of October : 4-inch pots will be large enough to winter them in. A little old cow-dung may be mixed with the soil for this potting. They should be kept near the glass, and fully exposed to the light, and watered when they require it during winter. The temperature of the pit should never range higher than 45° during the winter months. Towards the end of February they will have started into vigorous growth, and will then require to be shifted into larger pots. Generally speaking, 6-inch pots are large enough in which to flower them ; but if large plants are wanted, a few of the strongest may be put into 8-inch pots. Let the compost consist largely of good fibry loam, broken to

pieces, not sifted, and a liberal admixture of leaf-mould and sand, with a sprinkling of old manure mixed with it. The pots should be cleanly washed and carefully crocked, with an inch of old manure over the crocks. They must be still kept near the glass, and liberally aired on every suitable occasion. When the flower stems begin to appear they may get an occasional watering with weak liquid-manure, which will impart vigour to the plants, and improve the size and colour of the flowers. The centres should never be pinched out (the practice of many growers), as invariably the finest flowers are on the centre stem.

When the accommodation for wintering them in quantity is limited, they will do fairly well pricked out into pans or boxes, and potted up early in spring. Of course they will not be quite so good as those grown on in pots; still for ordinary purposes they will do very well.

Now a word as regards the saving of seed. A very common practice is to set the plants outside in some out-of-the-way place to ripen the seed, where they are often neglected, and become a prey to green-fly. If good seed is wanted, they should be as carefully looked after as when they are in a young growing state: at this stage they are even more subject to the attacks of aphides, from being so long under glass while in flower, so that they should be kept in a place where they can be fumigated, and properly attended to with water. The pots being crammed with roots, the demand for water is greater than ever.

J. G., W.



THE GARDENER'S PRIMER.

NO. VI.

So amenable are leaf-buds on stems to scientific treatment, that buds apparently dormant may be started, and set in motion, and become branches, by the simple plan, in the month of February, of cutting a notch with a fine saw in the bark just above it, so as to check the upward flow of the sap—the too rapid growth of the stem has caused the bud to be dormant—and arrest or divert some of it into the dormant leaf-bud, which will become a branch (in fact, a branch is only a developed leaf-bud). This is one of the many methods by which gardeners repair the loss of a branch where one has been lost on a pyramid tree, to give it symmetry.

Grafting is an operation at present confined to dicotyledonous plants, by means of which a portion of a plant containing one or more eyes or buds, called a scion or graft, is joined or inserted in another plant belonging to the same species, called the stock, and is effected in many different modes (not within the object of the writer to explain), such as by approach or inarching, or by detached scions,

or by budding—that is bud-grafting—but the result is the same. After the union is perfected the growth of the scion takes place, and the stock henceforth bears the scion instead of one of its own growth, which has been cut off and removed. Grafting has not been successful with monocotyledonous plants.

One object of grafting is to change the permanent characters of the graft or scion, by improving the flavour of the fruit, or rendering it more productive, of which there is some doubt; though it would be easy to surmise that a difference between the contents of the cambium layer or of the cell-tissue of the foster-parent or stock and that of the graft or scion might alter or retard the growth of the scion, so as to cause the production of fruit-buds instead of leaf-buds. Another object of grafting is to restore an old worn-out tree by cutting off its branches and using the stem as the stock, and grafting on it a new scion or graft. Another object is to propagate and increase a larger number of trees—for instance, recent introductions into this country—by grafting scions of them on to older and less valuable trees, and so provide a larger number than would otherwise be possible to do except during a number of years. Another object of grafting may be to place on the same monœcious plant the two necessary organs of a perfect plant—namely, the stameniferous and pistilliferous flowers. It need hardly be observed, that after the union of the graft or scion with the stock is perfect, the individual characteristics of the graft or scion are preserved. It is a popular fallacy that the blood-red Orange has been procured by grafting the Orange scion on the Pomegranate-tree.

By scientifically pruning fruit-trees in summer-time, buds which might otherwise remain leaf-buds are arrested and metamorphosed into fruit-buds; but fruit-buds, when once formed, can hardly be turned into leaf-buds, though they may be rendered abortive: and by improper treatment of a Vine, as by excess of moisture and heat, a crop of tendrils only may be produced instead of a crop of Grapes. And these cases are not difficult to understand when it is remembered that the different parts of a flower, even pistils and stamens, are only modifications of leaves, and that the tendril of the Vine is a modified flower peduncle—a continuation of the main axis. It is made up of a common peduncle, bearing two branches,—one is the flower tendril, always longer than the other branch, which is the flowering part or sub-peduncle. It is this sub-peduncle which is so easily modified, by improper treatment, into a tendril, however strange this behaviour may seem to be.

The flower-bud of mono- and di-cotyledonous plants, like the leaf-bud, consists of leaves placed at the extremity of the stem or branch of a

plant, but so metamorphosed from the ordinary leaf-bud that it requires some attentive study to understand it. It is either sessile or placed on a simple stalk, called a peduncle, on the top of which is the receptacle on which some of the floral organs rest (this peduncle is sometimes curiously hollowed out, as in the flower of the Rose and Apple, and in the Fig it contains the flowers), or it is placed on a branched stalk called a pedicel. If we examine it, beginning at the outside, we have first, at the base of the peduncle, a whorl of leaves called bracts, not necessarily green (in *Bougainvillea spectabilis*, coloured), of which there are several kinds, from the simple forms to the more elaborate spathe of *Arum*; or if it is at the base of a pedicel, we shall have bracteoles or an involucre. Then come the floral whorls, generally four in number, consisting first of the calyx and its parts or pieces, called sepals (sepalline leaves), not necessarily green (in the *Fuchsia*, coloured); then comes the corolla, its parts called petals, also metamorphosed leaves: and here we must revert to the discoveries of Mr H. C. Sorby of the different kinds of pigments in leaf-structure, and notice that the law of continuity running through the leaf-structure of every plant, wherever found, will hold good in the corolla, and explain how pigments in the leaf may also show themselves in the petals of the corolla; and one is not surprised to hear that it has been said that the greater the metamorphosis of leaf-structure, as in an irregular flower, the more variation of colour and markings may be expected. (This may or may not be so.) Then come, in our examination, the stamens, which are still metamorphosed leaves (staminate leaves), each stamen consisting of a stalk or filament with an anther on the top, one or more lobed, supplied with pores or valves containing minute cells, often yellow, generally in a free state, sometimes in company with others, sometimes stuck together, containing fluid protoplasm, called pollen,—they are parent cells, not grains, as they are often called. The formation of the free pollen cell—its structure and its behaviour in the protrusion of the pollen tube, and its endless diversity of appearance in the higher plants, easily seen under the microscope—will soon teach the gardener that there is no chance work here, but that all is the work of some master-mind. In the centre of the flower is the pistil, consisting of stigma, style, and ovary, also formed of metamorphosed (pistillar) leaves, or carpellary leaves or carpels, the edges of which have been so folded and tucked inwards as to form the style, of which there are many different forms; and at its summit the stigma, formed of cellular tissue, but without epidermis, whose office is to receive the pollen cell, which, either by falling upon, or by the work of insects, comes in actual contact with the stigma, and is soon followed

by the protrusion of the pollen tube (in Orchids this tube may easily be seen and traced to the ovule), which, passing through the stigma and style (often cylindrical), fertilises and energises the ovule in the ovary at the base of the pistil. These ovules are regarded as buds formed in the axils of carpellary leaves, and are the seeds, sometimes called seed-buds. The structure of the style (not always present), and the divisions of the ovary into dissepiments, all point to the fitting together of the edges or sides of so many carpellary leaves—the number of which made use of may sometimes be ascertained by counting the dissepiments of the ovary. The fruit, strictly speaking, is the matured ovary of the pistil (in its fruit state metamorphosed into the pericarp or seed-vessel), the result of the fertilisation of the pistil of one flower produced by the interaction of stamens. To understand the complicated question aright the gardener should study the flower while in blossom, and watch the silent changes and modifications of the ovary, whether for protection of the seeds or for food. One modification is into the pericarp, which consists of three layers, very clearly seen in the Peach—namely, the skin or epicarp, the fleshy pulpy layer called the mesocarp, and the stone, called the endocarp or covering of the kernel. It is to the adherence of the mesocarp to the endocarp that some varieties of Peaches have obtained the name of clingstone, and to the freeness with which others separate from the endocarp, the name of freestone owes its origin. Other modifications are the pulpy disk or receptacle of the Strawberry, the calyx and ovary and receptacle of the Apple, the developed pulpy state of the placenta of the Gooseberry and Grape, the bracts and floral envelopes of the Pine-apple, the peduncle of the Fig, and the calyx in the Rose. It will soon occur to him that he should find some trace of the style of the pistil, which he may often do (except in Cycadeæ and Coniferæ) even in a grain of wheat, which is a fruit and not a seed, and that our simple definition of fruit is not always sufficient. Several systems of classification of fruits are in use, none of them altogether satisfactory. We shall confine our remarks to simple, and multiple or compound, fruits. Simple fruits are formed either by the pistil of one flower out of a single carpel or carpellary leaf, instances of which are,—the follicle (*Pæony*)—the legume (*Pea*)—the achæmium (plural achænia) or achene, a closed fruit, dry, small nut, with the pericarp as in *Sunflower*—the caryopsis as in *Wheat*—the drupe (*Peach*); or by the pistil of one flower out of several free carpels or carpellary leaves, instances of which are,—several dry achenes on a dry elevated receptacle, as in *Ranunculus*—an etærio, that is, many fleshy drupes together, as in *Rubus*—dry achenes seated on a fleshy receptacle, as in *Strawberry*; or by the pistil of one flower formed out of several

combined carpels or carpellary leaves,—the nut (Hazel, Acorn, Sweet Chestnut); the berry (Gooseberry, Currant, and Grape); hesperidium (Orange); pome (Apple); pepo (Cucumber). The Holly is a drupe of four carpels combined with four seeds. The fruit of Hippophaë is achenes in a large coloured berry-like perianth. Multiple or compound fruits are the Sorosis (Pine-apple), a metamorphosed flower-spike with fleshy bracts and perianth; and the Mulberry, a spike of fruits; the Scyonus a hollow club-like receptacle formed out of the peduncle, as in *Ficus carica* (the Fig), lined with flowers inside it, seldom both barren and fertile in the same fig. The ovules at the base of pistil in each flower have been fertilised by small flies belonging to the genus *Cynips*, which resort thither to lay their eggs. It is said to be a triœcious plant—that is, to have either stamens or pistil, or stamens and pistil, in three different flowers in same Fig; and the strobilus or cone of the Pine, a spike with woody bracts. To revert to the ovule or seed-bud, or seed, as it is generally called, it is a mono- di- or poly-cotyledonous plant, according to its parentage, in miniature, made up of nucleus and integument: it contains in the embryo state its proper compliment of cotyledons, a plumule and radicle. The embryo differs in mono- and di-cotyledonous plants; its position, formation, and mode of attachment, the presence or absence of albumen, have all been utilised for the purpose of assisting in framing accurate diagnoses of plant-structure.

Whatever the structure of the fruit may be, it will be the main business of the gardener to learn how to produce it, how and when to gather it, and how to keep it for use. He will find that the Pear is a bag of cellular tissue in its early stage containing protoplasm; afterwards starch and sugar are supplied to it by the leaves of the parent tree; probably the cells on the rind contain chlorophyll, and assist in decomposing carbon dioxide (carbonic acid). After the Pear is gathered from the tree, there is so much life in it that it does not die, but resists decay. With its surface exposed to the air, however, chemical changes still go on in it, which result in the decomposition of the sugar in it, and the formation of alcohol and then ether, which gives to it its flavour and aroma; and as the process goes on the outside skin softens, spores of fungi soon penetrate into the inside of the fruit, and finding there suitable food, grow and induce fermentation, and the Pear loses its flavour, and the tissues are restored back again to their original elements, out of which the Pear was formed.

The young gardener will soon observe that some fruits—such as Peaches, Nectarines, Apricots, Pine-apples, Melons, &c.—are gathered some days, and Strawberries two or three hours, before they are considered to come to their flavour, or rather before the flavour

comes to them. Probably the reason for this practice is, that after the separation of the fruit from the tree or plant, in hot weather a few days, and in the case of the Strawberry a few hours, suffice to decompose the sugar and form the alcohol and ether, which is the flavourer, while our Pear takes a much longer time. It is no argument against this view that fruit is often better flavoured when gathered fresh from the tree or plant. If this be so, it is because the fruit has already hung on the tree or plant so long that the desired chemical changes have already taken place before its separation.

It is hardly necessary to add that Apples and Pears, when stored away, should rest on the stalk with their eyes visible, and not on the apex, as sometimes practised, with the stalk uppermost and the eyes downwards—a most uncomfortable position for any fruit.

LABORE VINCES.



GARDENS ENCLOSED WITH GLASS.

If the experience of the past season will only awaken gardeners and their employers to the gravity of future prospects of what are commonly called hardy-fruit crops, and cause them to inquire into the reason of the present dearth of fruit for ordinary supply, the empty fruit-rooms of this season, and the insipid and wretched appearance of what little they contain, will not have occurred in vain.

Clearly it is the duty of every gardener who is intrusted with the charge and management of any garden establishment of importance where the outlay is heavy, to bring all the experience of practical observation to bear upon the subject. The agricultural depression is being inquired into by practical agriculturists, assisted by gentlemen of great commercial knowledge and experience, and all the details of cropping, as well as the whole machinery of the system, are to be thoroughly sifted.

Is the practical gardener less intelligent than the majority of farmers? and are gardeners less capable of propounding schemes for the better management of gardens under the altered climatal conditions of Great Britain? I might almost say of Continental Europe, with little exception, during the present year.

I wish I could define the position as clearly in words as I fancy I understand it in thought; the matter would be easily accomplished.

At present most kitchen-gardens are enclosed by four brick walls, the cost of which was no inconsiderable item of expenditure. The south wall is generally occupied with forcing-houses, which answer the purposes for which they are intended admirably, and from a commercial point of view, when successfully managed, leave a very handsome profit on the right side of the balance-sheet.

The kitchen-garden, if economically managed and cropped, will also yield a good return for the labour expended upon it, besides having a constant supply of crisp, fresh vegetables, which cannot be purchased in good condition at some seasons of the year at any price.

The keep of pleasure and ornamental grounds are frequently, and, as I think, very unfairly, included as bad debts against the paying departments of the garden, but I have nothing whatever to do with them here.

We have now three walls left—the east, which is usually occupied with Apricots and Pears; the west with Plums, with perhaps a stray Peach or Nectarine at the most favourable angle connecting the two walls; and the north is usually employed for growing Morello Cherries and Kitchen Plums.

The north wall on the south side, where the situation renders it practicable, is generally furnished with Peach and Apricot trees. Now for results. Most of the Apricot and Peach trees on south walls are dead this year, and will have to be replaced. There were a few Plums on west walls; but on north situations they cracked on approaching the ripening stage, through constant saturation, and were for the most part rendered unfit for use; and Morello Cherries, which were laden with blossom, dropped nearly all their fruit about or previous to the stoning period. This is no coloured or exaggerated statement, but a simple revelation of painful facts. In the formation of new gardens the altered conditions of climate would suggest to any ordinary observant eye that bare brick walls are a misnomer of the past; and whether gardens of the future are to be large or small, I think there will not be much difficulty in propounding a more profitable mode of enclosure than the piling together of a lot of bricks.

The cheapness of glass, and now the lowering of artisans' wages, together with the skill of the modern horticultural builder, with the practical gardener "guiding the helm," would, I think, enable us, if we only put our heads together, to devise a plan which would supplant the present unprofitable one of enclosing gardens.

All previous experience points to glass-houses as being the best substitutes for brick walls. The houses should be light and roomy, and have a flow and return hot-water pipe along the front, for the purpose of equalising the discrepancy between the day and night temperatures in the spring.

Unheated houses are certainly better than bare walls, but the addition of a little piping would be more than compensated for in value in a good succession of regular crops. Span-houses would give a double crop, and are very accommodating for giving air in boisterous weather: raised restricted borders would be the idea, as giving a minimum of labour and quick returns. When piercing winds are prevalent in the spring, the situation might be modified by the skill of the architect, so that heat enclosed in the afternoons of sunny days, or artificial heat

otherwise supplied, would not be absorbed by radiation. The better class of fruits—such as Peaches, Plums, Cherries, and Apricots—might be more condensed in area; and Pears, which seem to do better than anything else, might still occupy the bare walls.

In addition to the regular crops of fruit, there would be early crops of Potatoes, French Beans, and Peas *ad libitum*—delicacies which green-grocers know how to charge for early in the London season. So much for new gardens, some one may say, but what about the old? My answer is, that one-half the expense is already laid out where there are existing walls already furnished with fruiting trees. Cover the walls or some portion of them with glass, and have regular crops of fruit and crops of early vegetables, which, I dare venture to assert, are a costly commodity to London families during the months of April and May.

I know a range of fruit-houses in the neighbourhood of Liverpool 101 yards long, where the back wall is covered with stone fruit-trees which produce never-failing crops, and the borders supply early crops of Peas, Potatoes, Beans, Cauliflowers, salading, &c., which are invaluable, and which at that time of year could hardly be purchased for love or money. The protection of fruit-trees in flower by means of Fern litter, spruce branches, tiffany, and all the other remedies, which are as numerous as patent medicines, are proved to be a perfect sinecure, and nothing short of some really effective remedy should be discussed by practical horticulturists in future. Let the financial bearings of both sides of the question be fairly compared, and I feel confident that only one result will follow.

W. HINDS.

CANFORD GARDENS, DORSET.



THE CARNATION.

THERE is an apparent revival in the love for this old-fashioned florist-flower; and as the requirements of the plant are by many who wish to cultivate it only very imperfectly understood, a note on its cultivation may be acceptable to many. Some of the free-growing sorts are comparatively common—as the varieties which are clove-scented, and some of the Picotees; but the kind of treatment which will suit these is simply enough to kill the finer and more tender kinds. It is therefore necessary to grow these in pots. The present is the only season that we have had anything like success with Carnations and Picotees planted out of doors. But even with the amount of success attained, we will plant none but the strongest-growing kinds out in future. Most florists do not consider Picotees and Carnations as admissible in the same stands, and I was somewhat surprised to find the two staged together at the exhibition of one of the very oldest societies. And no doubt they were in a degree right, as Picotees are as much Carnations as are Bizarres or Flakes. In addition to these old-estab-

lished sections, within late years there have been some self-coloured flowers introduced which to many growers will prove very valuable, as they are extremely hardy, vigorous in growth, and free in flowering. In fact, unless special care can be taken of them, cultivators would have more satisfaction in growing these with a selection of Picotees, and a few of the very strongest-growing of the Bizarres and Flakes, than in growing too large a collection of the finer kinds. When planted out of doors, the ground should be turned over to the depth of at least two feet the autumn previous to planting, and again in spring dug over to a good depth, in order to have the ground in a free and open condition. This is a point of considerable importance, as unless the soil is in a condition to insure quick rooting and a free and strong growth before the sun gains much in power, the plants are very liable to die off. The end of March or beginning of April is time enough to plant out. The most suitable sorts for planting out are Rev. J. Dix, Excelsior, Princess of Wales, and Brilliant—Selfs ; Lord Valentia, Regularity, Countess of Wilton, William Summers, Lady Elcho, Mary, Picco, Beauty of Plumstead, and Bertha—Picotees ; Garibaldi, Mars, Queen Victoria, Warrior, and Purity—Bizarres ; Ajax, Squire Meynell, and Sportsman. These are a few kinds which have been found to succeed with above treatment.

When cultivated in pots it is a very necessary point to have the plants strong before placing them in their blooming-pots : no after-culture will make up for a lack of strength at this stage. It is consequently of importance to have the layers rooted early, and potted into small pots as early in October as possible, to secure this. Or if plants are to be purchased, no time should be lost in doing so. In cases where the plants are weakly, and make no progress in cold frames, they should be removed to a structure where they can be kept just moving, at the same time that plenty of air can be introduced in fine weather to keep the foliage strong. The kind of soil that they appear to delight in is a light loam, with the addition of a little rotted manure, such as spent mushroom-dung. It is not well to pot too early, in case of check afterwards ; but the beginning of April is quite as late as this should be delayed. A 9-inch pot will grow two plants. The drainage should be made thoroughly good, the soil firmed as much as possible, and means taken that the soil does not get saturated with rain before the roots have got a good hold of the sides of the pots. If a covering of sashes can be secured in case of necessity during the first six weeks after potting, there will be no fear of the plants afterwards. The routine work of the summer months consists in watering regularly, keeping the growing flower-stems tied to their stakes as they advance in growth. If intended for exhibition, the buds must be kept thinned—from one to three on a stem being a sufficient number to leave. The sashes may be again called into use when buds commence to open. Covered with these there will be no danger of the flowers being damaged with rain. A watchful eye must

be kept on the buds as they attain to a full size, employing strips of matting or of small india-rubber rings to keep the calyx from being burst. The calyx will also require to be slit at the divisions in order to allow the flowers to develop symmetrically. Cards may also be employed to further insure the same result ; but to many, such a mode of helping a flower will appear too artificial.

The shoots should be layered directly they are far enough advanced to be operated on. Many cut off the ends of the grassy foliage when layering ; but this is not necessary. What is more a necessity is to cut the shoot in a manner that the thinnest portion will be that which connects the layer with the parent part. Do not allow too many shoots to remain for layering, as it will give more satisfaction to have one really strong healthy layer than can be had from four times the number of weakly ones. When potting up the rooted plants use a good open loam merely, and stand the plants out of doors until root-action has again commenced. This is much better than shutting up in frames in order to induce the roots to form quickly. I would reiterate the necessity of keeping weakly plants growing throughout the winter, always avoiding the least approach to a stagnant atmosphere under such treatment. As all the kinds usually sold by nurserymen are worthy of cultivation, it is unnecessary to add a list of names.

To those who want a supply of flowers in autumn for filling glasses, &c., nothing can be more satisfactory than these plants—the Self varieties and Picotees being more particularly adapted for this purpose than the other classes, the treatment required being something as near that recommended for those planted out as can be provided. Duke of Wellington should be added to the list for this purpose. We have it in quantities now—the middle of October.

R. P. BROTHERSTON.



A FEW WEEKS' GRACE FOR EARLY-FORCED TREES.

If it be correct, as stated, that the past season has been the most unfavourable on record for the ripening and development of all kinds of fruit-trees, the suggestion seems to offer itself whether it would not be discreet policy to defer forcing Vines and Peach-trees for a month or six weeks later during the coming year.

It is not at all improbable that some one may write and tell us that their Vines and Peach-trees are in grand condition—that they never looked better,—and that, in fact, everything looks flourishing for another year.

I hope there are many cases of this kind. I know, indeed, there are many excellent cultivators, with modern facilities for forcing, such as well-appointed houses, who have been able to discern, during the early part of what we may now almost call the past year, that especial care

would be necessary in order to bring about a thorough state of ripening in Vines, Peaches, and other fruit-trees. But it is to be hoped that those who are so favourably circumstanced will not forget the scores of places where fruit has to be grown in low, old-fashioned houses, with every square of glass no larger than a biscuit, and wooden rafters thick enough to make sleepers for a line of railway.

These conditions, together with perhaps insufficient means of ventilation, have been great drawbacks during the past summer; and say what people may, they are sure to have left their mark behind them—more especially where thick planting is adopted, and in gardens where an adequate staff is not allowed and work has fallen into arrears, and in the struggle to make the best of a season beset with great difficulties, the work of pinching and thinning to the necessary degree has been unavoidably neglected.

The wood in our earliest Peach-house is greener now, at the beginning of October, in Dorsetshire, than I have ever seen it in Lancashire at the same period, with the balance of favour, as regards structure, being in every respect on the side of the former.

Pot-Vines and Peach-trees in pots are so wonderfully cheap nowadays as to render the suggestion I have thrown out practicable in every garden of ordinary pretensions.

A dozen Pot-Vines, and a like number of Peach-trees in pots, of the early kinds—the latter of which might be brought forward in any house with a night temperature of 45° , and be pushed along afterwards when the fruit is set—would yield a few dishes of fruit at the commencement of the season, and spare the early-forcing until the first day of the new year dawns upon us, and which, I hope, will bring the advent of a more happy augury for fruit prospects in succeeding years.

It is for pot work that such varieties as Early Beatrice are worth growing, as in a pot it is always a portable subject, and can be made amenable to any condition that occasion may require. Amongst Nectarines Lord Napier is a grand pot variety: it grows to a large size, and forces well.

A better quality of Grapes might also be procured from the pot-Vines by dividing them into two batches; and by cropping the last half rather lightly, and starting them a little later, finer berries and better finish would be obtained.

Where it is proposed to grant this short period of grace or recuperation to hard-forced subjects, the situation should be taken advantage of to renew the borders partially; and, where it is necessary, if possible, also to renew very old trees that are showing signs of decay, with younger ones of appropriate kinds, or good bearing trees—where they can be spared—by economical thinning out on the outside walls. This work should be undertaken at once,—first, by rooting out all worthless trees, and thoroughly cleansing everything inside the house—the trees

themselves included—and removing all the surface-soil off the borders from 6 to 9 inches deep carefully with forks, preserving all the feeders by tying them in bunches, and suspending them with a “soft” piece of matting to the bole of the tree. Of course, if there is any suspicion of the drainage of the borders being wrong, the better way would be to lift the trees altogether, rectify the drainage, make new borders, and replant; but in the majority of cases, a good addition of fresh soil, with an admixture of crushed bones and lime rubble, will answer the purpose.

In laying in the roots, they should be set thinly between the layers of fresh soil; and “knotty”-looking roots which produce suckers in great quantity will be better removed altogether. After the borders are made up to the required height, and made firm, according to the condition of the soil, they should be mulched over with short, rotten manure; and if forcing be conducted slowly, until the roots lay hold of the fresh food supplied to them, the trees will take out a fresh lease of life, and increase their fruit-producing power threefold. The same remarks will apply equally to early-forced Vines, except that in the event of their being far wrong at the root, and new borders have to be made, it is preferable to start with young Vines afresh, as I think it is more cheerful to contemplate a prosperous future than to live upon the thoughts of past achievements.

W. HINDS.



NOTES ON COLEUS.

THE cultivation of Coleus is comparatively easy, and so well understood by the majority of gardeners, that cultural details are almost unnecessary. Notwithstanding the ease with which they are propagated and grown, which in a great measure accounts for their being looked upon as common, what class of plants gives us so many beautiful and striking features in their foliage? During summer we could scarcely call a greenhouse or conservatory thoroughly furnished without these singularly effective plants, they contrast so well with flowering plants of every shade and hue. Their usefulness in this respect is well known; and in winter they are equally attractive in the stove. The modern style of flower-gardening could not dispense with them very well, at least with *C. Verschaffeltii*, with its rich crimson leaves and its improved variety, which is even of greater brilliancy. For the decoration of rooms during summer they are invaluable, and stand well where gas is not used,—in fact, they can be used in warm rooms throughout the greater part of the year. They scarcely repay one for the labour and the space devoted to growing them in large pots for winter decoration, except for the production of their bright

leaves for the ornamentation of the dinner-table. They are, however, most useful in winter, when a number are rooted singly in small thumb-pots, or when three or four are propagated together in a 3-inch pot, to be turned out of those pots and united with small ferns where plants have to be massed together in baskets or very large vases.

Many new and improved varieties have recently been introduced to our notice. Some of them are grotesque looking and very beautiful, presenting nearly every shade of colour in their leaves, arranged in the most fantastic forms. The leaves of the Shah, Lady Burrell, and Pine-Apple Beauty are very much alike, one-half being yellow and the other of dark colours. In our estimation it matters but little which of the three varieties is grown, as the difference is imperceptible except in the lower part of the leaf, which in Lady Burrell is dark maroon, while in the Pine-Apple Beauty it is more of a scarlet shade. Golden Gem is much after the style and appearance of Princess Royal and Queen Victoria, but is much more fringed at the edge of the leaf, and much richer in colour than either of the other two varieties. Beauty of Widmore, Eldorado, and M. J. Linden should be grown in every collection. Of the four, Exquisite, George Bunyard, Royalty, and Gurnet, the two former are considerably the best and most worthy of cultivation, while the latter two are distinct, and an improvement on the older kinds. Fascination is really a first-class variety, and commends itself to all growers of this ornamental class of plants. This is not by any means a plant of vigorous growth and hardy constitution, yet is very distinct from all others. It is a valuable plant in small pots, and makes a handsome pyramidal specimen on account of its free-branching habit; and in our estimation it is a great acquisition. Kentish Fire and Lord Falmouth are much the same; and where one is grown the other can well be dispensed with. The ground colour of the latter is creamy-yellow, suffused with pink; while that of the former variety is nearly black, the centre being deep crimson, and is most worthy the notice of all growers. Novelty, which is somewhat after the style of Fascination, is a most lovely Coleus, quite distinct, and of a most delicate nature, both as regards its appearance generally and its growth. It resembles Fascination only in the formation and construction of its foliage, while it differs widely from that species in colour, presenting a vast variety of tints of the most delicate shade and brilliancy.

We have the latest introductions from the South Pacific Islands before us, and consider Distinction and Surprise by far the best. They are both distinct, and will undoubtedly be generally grown when they become better known. Distinction is novel and effective, with its deeply crenated leaves, of a bronze-green colour, and beauti-

fully shaded with violet-crimson, the veins and mid-ribs being rosy-pink. Surprise possesses all the characteristics of Distinction, with which variety we have ventured to couple it, and is indeed a gem, differing from that variety mainly in the colour of its foliage, which is green, striped with yellow, the latter shade changing almost to white as it arrives at a state of maturity. Aurora, Glow, Magic, and Sparkler, as they vary but little in habit, vigour of growth, and the general formation of their foliage, may be suitably described together. Aurora possesses colours singularly bright and telling; the leaves are of a yellowish hue, with a blotch of rose colour down the centre. Glow is also bright, and marked much after the manner of Aurora, with this difference, that the foliage is dark, with rosy carmine of slight magenta shade down the centre, and a narrow margin of green. Magic is marked in a similar way, the colour of the centre being pale yellow, and a little more feathered than the other varieties; the remainder of the leaf is green. Sparkler is also marked down the centre with a reddish-maroon tint, having a deep crenate fringe round the margin of the leaf.

Harlequin will undoubtedly prove a very useful kind. It is very distinct, being variegated, like marble, with purple, bronze, and chocolate, which are laid on in the most peculiar form, thus rendering the plant striking and attractive. It is a vigorous grower. Sunbeam is a dwarf grower, and in colour distinct from any of the new varieties. The leaves are of a reddish tint, shaded with rose, and the colours vivid and bright. Of the variety Firefly we are not in a position to speak with accuracy, as our plants are not yet by any means attractive.

WM. BARDNEY.



MYOSOTIS DISSITIFLORA FOR WINTER FLOWERING.

THIS is very much appreciated here during the dark dull days of winter, and as it can be had by any one possessing an ordinary greenhouse, it is a pity it is not oftener seen than it is. To get up a stock of plants for this purpose, it is only necessary to pull the requisite number of pieces off old plants, and insert them in ordinary soil on a shady border about the beginning of August. Seeds sown about the end of June will furnish plants equally suitable. Cuttings strike root without any particular care, and if put in at the time and in the manner indicated, will become plants ready for potting off about the beginning of October. We use 4½- and 5-inch pots, and in potting, take any potting-soil handy. Lifted with good balls, they never know they are moved. After they have stood in the shade for a day or two,

we place them in an ordinary frame on a dry site, and here they are treated to all the air going in all weather, the lights only being used for the purpose of keeping off heavy rains. As they are rapid rooters the pots soon fill with roots, and care is taken to prevent them flagging for want of water; otherwise they are kept as dry as possible, and this tends to make them free-flowering. In ordinary mild winters they will bloom in the frames, and in any case are sure to do so very early in spring. To have Forget-me-nots all winter is, however, the easiest task imaginable, and all that is wanted in the way of forcing is to bring in a few pots at a time into any house kept at greenhouse temperature, when they will throw up their trusses in a week or two, and continue blooming for a long time.

Few flowers are more appreciated; and if once it is grown in winter as described, it will be in demand ever after. For those with little means of producing flowers in winter this is an invaluable plant.

GARDENER.



LOBELIA CARDINALIS.

THERE are now many varieties of *Lobelia* all more or less attractive, some for their neat habit of growth, others for their fine telling colours, while in many instances there is a pleasing combination of both, which makes the *Lobelia* a general favourite. The variety specially under our notice at present is *Lobelia cardinalis*, var. *Victoria*, a tall erect-growing variety of neat-branching habit, something in the style of a branched chandelier. It grows from 3 to 4 feet high, with large bright-scarlet blooms, which are produced in great profusion. The terminal shoot, blooming first, generally puts out a lateral shoot immediately under the bloom-spike, which is tied to the stake (of which we only use one) and is thus ready to bloom along with the branches. When in full bloom these, with their dark-crimson foliage and scarlet blooms are very telling subjects in a general collection of plants, judiciously arranged. They like a rich compost and occasional feeding with liquid manure. Their propagation is easily effected by off-sets, which they throw up in quantities, often carpeting the surface of the pot, and also by cuttings, which strike freely in a compost of equal parts, sand and leaf-mould, placed in heat and kept regularly moist. We have tried them in the flower-garden, and for centre-pieces, cross-bars, and such like, and think they will soon out-rival the almost indispensable *Irisine Lindenii* and Dell's Beet—the former of which has been very patchy this season, and the latter, as far as we have seen, very coarse and badly coloured.

J. PROCTOR.

THE PRIORY GARDENS, ST ANDREWS, FIFE.

DELL'S HYBRID MELON.

FROM what we learned of this Melon before it was sent out, a very high opinion was formed of it. We have this year grown a span-roofed Melon-house, 80 feet long, full of it, excepting a few lights devoted to Cucumbers, and in every way our expectations of it have been fully realised. For the last eleven years the same house has been devoted to various Melons of excellent reputations. But notwithstanding the most unfavourable season, perhaps, ever experienced by any gardener now in practice, we have never taken so many really good Melons out of the house. It is evidently a variety with a robust and fruitful constitution, for it set freely in spite of constant rain and almost entire absence of sunshine. Judging from its flavour, under most unfavourable conditions for developing that important quality in Melons, it must in ordinary seasons be of exquisite flavour. This is, indeed—to say nothing more—highly probable from the fact that, among numerous Melons that were submitted to the London R. H. S. Fruit-committee, Dell's Hybrid was the only one to which a first-class certificate was awarded the year before it was sent out. At all events, we do not intend to grow any other Melon than this green-fleshed one.

**NOTES ON THE STRAWBERRY CROP OF 1879.**

THE Strawberry is such a universal favourite among all classes of the community, that anything bearing upon its culture will always receive a certain amount of attention. The present season has proved itself one of the most disastrous on record for almost every kind of crop, and has been particularly so in the case of the Strawberry crop. The plants flowered most profusely, and the early prospects of a good return never were better. But alas! from the time they began to bloom, the rain came down with un pitying severity, and continued daily, almost without intermission, so that only a small proportion of the earlier kinds set their fruit, and even many of those that did swell rotted off in a green state, through being continuously soaked with rain. Altogether there was not half a crop, and in many places not even that. One market grower of our acquaintance informs us that he estimates his loss on this crop alone at £200. Some of the latest kinds gave pretty fair returns, notably so with us in the case of Dr Livingstone and Elton Pine. A few notes on the kinds grown here may be of some little interest to a portion of your readers. The soil here is moderately heavy, and our elevation is about 300 feet above sea-level.

The old standard variety, Keen's Seedling, in ordinary seasons succeeds well here, crops largely, and swells to a good size; this season, being among the earlier flowering kinds, it produced little or nothing, and that of small size. President does not do well on some soils, and

here it does not crop well, if the ground be very rich, so that we generally plant on poorer soil and get good crops ; this season it did pretty well, as compared to many other kinds, and the fruit swelled to a fair size. Vicomtesse Hericart de Thury (Garibaldi) is a fair cropper here, though the fruit does not swell to such a size as we have seen it elsewhere ; we always grow a lot of it to obtain runners for forcing ; this season it was much below the average, even as compared with the other kinds. Belle de Paris : this is an abundant cropper here ; I have never seen it grown anywhere else, at least under this name ; the fruit is not large, is of conical shape, and dark in colour ; it is evidently closely allied to, if not identical with, Black Prince ; it is a good variety for the preserving-pan, for which purpose we mean to grow a quantity. James Veitch gets a great name, and may be worthy of it, but I cannot speak favourably, from my experience of it, as it refuses to grow here at all ; I have tried it for two years, and it has died almost outright. Aromatic is a very nice fruit, of good flavour, but like the last, does not thrive here, and I have never seen it elsewhere. Dr Hogg : this variety has produced some nice fruit, but I cannot regard it as a good cropper here ; this season it has done nothing. Rifleman : this is generally an excellent cropper, but has the fault of not colouring well to the tips of the fruit, which deteriorates from its qualities as a table fruit ; it has done fairly well this season. Duke of Edinburgh : this variety is bound to take a leading position among Strawberries ; its large handsome fruit and good constitution will commend it to most growers ; the flavour is not all that could be desired ; but it is a heavy cropper, and has done fairly well this season. Dr Livingstone : I cannot speak too highly of this variety ; the fruit is almost as large as "The Duke," but of better flavour, while it has proved the best cropper I have had for the last two years. British Queen is still one of the best-flavoured Strawberries, but it does not thrive very well here, so we do not grow much of it. Elton Pine is indispensable as a late variety ; it is an enormous cropper here, and has been one of the best this season. Sir Joseph Paxton and Sir Charles Napier we have just introduced this season, so I cannot speak decidedly about them ; they promise well however. We still grow a quantity of Grove End Scarlet for preserving ; this season it has grown too much to leaves. Strawberries are so much like Potatoes in this respect, that it is an advantage to have a change of plants occasionally ; and most growers err in planting too closely. Strawberries like plenty of room in which to develop themselves. They should never be planted closer than 30 or 33 inches between rows, and 21 inches between plants : this admits of getting them cleaned better, and allows of the air getting more freely about them, as also of getting them bedded when the fruit is on them ; and a much larger crop will result from this than by the old method of close planting, as well as getting the fruit of superior quality.

J.G. W.

HEATING BY HOT WATER.

NOTWITHSTANDING the editorial note at the end of the papers on the above subject in the September issue of 'The Gardener,' I ask room for the following remarks. I would not have made this request if Mr Makenzie in his last paper had not attributed to me assertions which I have not asserted, and assumptions which I have not assumed, at any time during the controversy.

I have not at any point in the discussion "asserted that a vertical rise is a hindrance to the circulation, and is the cause of repeated failures in the working of hot-water apparatus." On the contrary, I assert that the highest point of the apparatus should be reached by a *vertical* pipe out of the top of the boiler; and that when the heated volumes of water have to reach the highest point by travelling up a slow gradient of hundreds of feet in length, the result is a return current in the flows, which is a hindrance to circulation, and the cause of an immense amount of heat being wasted in the stoke-hole.

Mr Makenzie admits "that there is no *necessity* for the pipes having a continuous ascent." Then why is it that in 999 cases out of 1000 they are fixed in this way? And why does Mr Makenzie advise us to have our stoke-holes as deep as practicable? There being no *necessity* for a continuous ascent of the piping, there is no *necessity* for a deep stoke-hole.

I have not, at any time during the discussion, asked Mr Makenzie "if the upper strata in the flow-pipe travels faster than the lower strata." This is what I asked—Does the upper and hotter stratum travel faster than the under and colder stratum on the *downhill* journey? And if not, why not? And I again, for the third and last time, respectfully ask the same question. I have not, at any time during the discussion, assumed that the mere fact of water becoming hotter "makes it fly away from the earth." The heated water would remain in the boiler if colder water did not come in contact with it. The colder being of greater density than the hotter, moves towards the lowest place; and the hotter being of less density than the colder, moves towards the highest place. The movements of both are movements in obedience to the law of gravitation, in accordance with their respective specific gravities or densities. This fact I pointed out in 'The Gardener' of February last; and what I have been contending for since is, that the apparatus should be fitted up in such a way that at all points thereof the volume of water therein will move of its own accord in the *right* direction, in obedience to the law of gravitation, and not have to be *forced* by the succeeding, or *drawn* by the preceding, volume in that direction. Mr Makenzie invites us to "come and see water at 80° forcing water at 60° uphill." Now, suppose we did see water at 80° forcing water at 60° uphill, we would only have an ocular demonstration that the apparatus in which this took

place was fitted up on a wrong principle. We would be looking at an apparatus in which the colder water was floating or forcing the hotter water up out of the boiler into the flow-pipe ; but once the hotter gets into the flow-pipe, a change takes place, and the *hotter forces the colder uphill*. Could anything be more condemnatory of the practice of having the piping fixed with a continuous ascent than that, when so fixed, the process of circulation takes place as here described ? If it is right both in theory and practice that the colder water should force the hotter up out of the boiler, it is right that the colder should force the hotter uphill at all points of the apparatus. The law is, that when two fluids of different densities are in immediate contact with one another, that of greater density descends and takes the lowest place, and that of lesser density ascends and takes the highest. And therefore, if the hotter water lifts the colder at any point of the apparatus, it is a proof that the method on which the latter is fitted up tends more to hinder than to facilitate the process of circulation.

Mr Makenzie tells us that "atmospheric air is lighter than water bulk for bulk." This fact I think is pretty generally understood by most people. But atmospheric air *cannot force water bulk for bulk uphill*. It takes a column of atmospheric air somewhere about forty-five miles high to balance a column of water somewhere about thirty-five feet high. And a column of atmospheric air of the above height could not force the water uphill one inch unless the pressure of the atmosphere was removed by a mechanical or other contrivance from the upper end of the tube in which the water is wanted to rise.

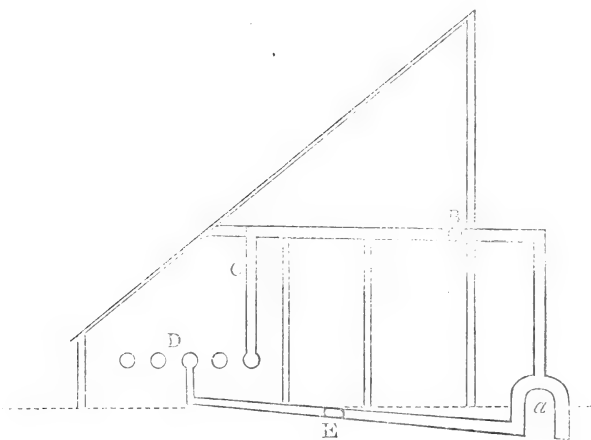
The "suction-pump" theory of circulation will not work alike at all points of the apparatus, nor will the "strata" theory. We therefore conclude that neither is the right theory. The latter works alike at all points, and "does not take up a fragment of the subject and forget all the rest."

I agree with Mr Henry J. Pearson that "glass houses are, or should be, arranged so that plants may be grown successfully, with the greatest economy of labour possible, not to put hot-water apparatus in ; and a system which will not admit of doors and paths being placed where required is at once condemned, *even* if the water does circulate the best in that form." But if Mr Pearson thinks that the method of erecting the hot-water apparatus recommended by me would be prejudicial to the growth of plants, or interfere with the economical working of the houses to which it was applied, he is mistaken in his conclusions. The same facilities for having "doors and paths where required" are offered by the method I advocate as are offered by the method in general practice. And by adopting the former we get over the necessity for those "unmitigated nuisances," as Mr Makenzie truly terms them—deep stoke-holes, and for dipping and rising again of the pipes. When "dips" occur, they render the circulation uncertain and extremely difficult. The annexed figure will show how to heat a lean-to range of any

number of compartments without sinking the boiler more than 1 foot below the floor on which the main body of the piping is laid.

a, Boiler; B, Main flow-pipe, rising above the door-tops against the back wall, enclosed in a wooden case filled with sawdust; C, Branch pipe, carried over door-top from main flow and attached in the usual way to the pipes D for heating the compartment; E, Main return-pipe, running the full length of the range a few inches below the floor-level. The dotted line is the supposed ground-level. The branch pipes over doorways to be covered with ornamental grating, or otherwise ornamented to correspond with the woodwork of the houses.

In this form of the hot-water apparatus Mr Pearson thinks air would be troublesome. Well, I do not underrate the resistance offered by air to the circulation of the water through the pipes; but in this form



the heated air will get to the highest point by a shorter route than it does in the form in general practice. In the latter form the air finds its way to the highest points, and provision is there made for its escape.

In the form represented by the accompanying figure the air will also find its way to the highest points, and the usual means for its exit from the pipes will be provided. And if Mr Pearson has nothing of a more solid nature than *air bubbles* to offer in opposition to this form, I have no doubt of being able to prevent any obstruction that they, through their aerial nature, may be disposed to offer to the free circulation of the water through the apparatus.

Mr Pearson next says: "If the houses were built for the pipes, and not the pipes for the houses, he would let the water rise the whole way until it is about to re-enter the boiler." In reference to this statement, might I presume to ask Mr Pearson if he is ready to stake his reputa-

tion as a hot-water engineer that the circulation of the water will be as rapid in an apparatus having the pipes fixed on a continuous ascent their whole length, and with a vertical return as the water re-enters the boiler, as if the heated water ascended by a vertical rise to the highest point at first, and then descended the whole way until it re-enters the boiler?—the conditions, with the exception of the mode of arranging the piping, to be exactly the same in both cases.

I have repeatedly put this matter to the test—with a miniature apparatus, consisting of a saddle-boiler 9 inches by 3 inches, having 50 feet of half-inch pipe attached thereto—and always with the same result,—that is, when the heated volumes of water rise vertically to the highest point, the 50 feet of pipe becomes hot the whole length in less than half the time it takes to become hot when the heated volumes have to reach the highest point by a slow gradient and re-enter the boiler by a vertical descent. Let it be understood that in both cases the elevation is the same, the source of heat the same, the only difference being the different way of fixing the pipes.

I would also remark that when the pipe is fixed on the former method the boiler keeps cool compared with what is the case when the pipe is fixed on the latter. When fixed on the former, the heat is carried quickly away from the source, and is distributed where it is of use. When fixed on the latter, the heated water cannot get away quickly, and therefore remains and heats the stoke-hole.

Mr Pearson asks if I “intend to state that water in the return-pipe will fail to fill the vacuum caused in boiler by the rise of the heated water in the same time, if it have only an inclination of 1 foot in 100, as if it had 10 feet to fall in the same length?” And he answered this question by saying: “If so, all rivers would flow at the same speed.” When Mr Pearson wrote the foregoing question and answer he appears to have forgotten that the water in the hot-water apparatus has to *ascend* as well as *descend*, and that the ascent is equal to the descent; whereas the water of a river flows *downhill* from the fountainhead until it finds its level in the sea. There is no analogy between a running stream and the circulation of the water in the hot-water heating apparatus.

C. M. having agreed with me that a *continuous* ascent of the flow-pipes is *not essential* to rapid circulation, I have little more to say to him. I would remark, however, that C. M.’s ideas on the subject of heating by hot-water are of such a “mixed” nature from beginning to end that I find it rather difficult to “equalise” them, and it strikes me he has been attempting to deal with a subject of which he has had very little practical experience. In one of his papers he “reminded” me of some things and “informed” me of others, for which I now thank him. And in return I beg to “remind” and “inform” him that he has missed (seeing the discussion is closed) a grand chance of

becoming famous as a hot-water engineer, through his not having the courage to back his opinions by appending his name and address to his papers.

J. HAMMOND.

BRAYTON.

[When we stopped the discussion last month it did not occur to us that Mr Hammond, as the originator of the discussion, had a right to the closing article, hence the insertion of this paper.—ED.]

ALTHOUGH the hot-water question has received notice to quit your columns, we trust we may be permitted space to correct a typographical error in your September issue. In stating the number of feet of piping attached to our Twin Climax boilers, we wrote "about 5800 feet." Your compositor, by reversing the two first figures, made it read 8500 feet. We repeat, that these boilers are computed to heat 4000 feet each; and we believe this statement is based on calculations of high authorities on the subject of hot-water heating—yet Mr Makenzie says, that in our case he would "never think of loading them with above 2500 feet each."

Since your last issue we have been visited by one of your correspondents, a practical and "qualified" hot-water engineer, who, after a most careful examination of the whole apparatus, failed to find anything materially wrong with the arrangement of the pipes with regard to circulation (according to the principles mentioned and followed by Mr Hammond's opponents), and he arrived at the conclusion that the boilers were too weak for the work they have to do. Since then we have thoroughly tested the power of these boilers. A mild day was chosen—fires put out, pipes allowed to get cold, one boiler shut off, fire re-lighted under the remaining one, heated water turned on to house after house, beginning at the lowest level nearest the boiler, until we had, and still have, 4216 feet of 4" piping heated to hothouse temperature by one boiler: it is only when we require heat in the houses on the higher levels that our real troubles begin.

JOSEPH HAMILTON & SONS.

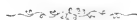
WELLINGTON PLACE, CARLISLE.

I DID not intend to have anything more to say on this matter, for reasons which I previously stated; but my apology for having to do so is, that I find Mr Makenzie in his last has shown a remarkable disregard for facts, and has, whether intentionally or not, misrepresented and placed me in quite a false position before your readers. This is in reference to what he alleges I stated as to "pressure or gravitation" having nothing to do with the circulation of the water in the pipes. How Mr Makenzie could draw such an inference from the sentence referred to is certainly beyond my comprehension. If Mr Makenzie will take the trouble to refer to p. 327 (July), he will there see that I *do* think pressure has to do with it, but it is only as a secondary agent; and how it can be made out to be the "sole and only cause" of circulation, I cannot see. Withdraw the *primary* cause, the heat—which, rightly or wrongly, we assume to be the motive power—and how long would circulation go on? Only until the pipes got filled and the water found its level. I think Mr Makenzie

should be careful as well as clear in his writings, as in another sentence he says Mr Hammond and some others asserted that a continuous or vertical rise is a hindrance to circulation. What is to be inferred from this? So far as I understand, the whole discussion arose from the statement that the continuous rise was a hindrance, not the *vertical*; and that the latter, rising at once to the highest point from the boiler, was the better system (see p. 421). And this is the reason why I drew a distinction between this and a body of water of a uniform temperature throughout—as in this case I assume we have a different motive power to that we have in a body of, say, cold water, raised by pressure or gravitation, of which I have had ample experience in works it was my duty to see carried out.

ROBERT STEVENS.

[These papers are positively the last we can insert on the heating question for the present.—ED.]



SCOTTISH HORTICULTURAL ASSOCIATION.

At the monthly meeting held in the Hall, St Andrew Square, Edinburgh, on Tuesday the 7th October, Mr Dunn, president, in the chair, there was a numerous attendance of members and others interested in horticulture. A paper was read from Mr Johannes le Clerc, nurseryman, Haarlem, on "The Culture of Bulbs in Holland," in which he gave an interesting account of the mode in which Hyacinths, Tulips, &c., were reared and managed by the Dutch growers. Mr W. Ivison Macadam, lecturer on chemistry, next gave a lecture on "The Food of Plants." After pointing out the importance of gardeners acquiring a knowledge of the chemical composition of soils, along with the ash of the plants grown thereon, and showing, by the aid of a number of diagrams, the constituents of the various manures now in use, and their value as fertilisers of the soil, the lecturer compared the cost of the natural and artificial manures, placing their several agricultural values alongside each other, and showed that farmyard manure was the most expensive, and, in the majority of cases, quite inadequate to meet the wants of ordinary crops, strongly recommending the adoption of the "Association Standards," which were periodically fixed by a committee, and which could be thoroughly relied upon. It was resolved that this lecture, which Mr Macadam kindly placed at the disposal of the Association, should be printed for distribution among the members.

A communication was read from Mr G. Robertson, Mordington Gardens, descriptive of a number of cut blooms of herbaceous plants, which were on the table for exhibition.

Mr P. Fairgrieve, The Gardens, Dunkeld House, was awarded the Society's Cultural Certificate for a fine collection of stone fruits, consisting of five dishes of Peaches, fifteen of Plums, three of Nectarines, five of Apricots, and one of Cherries, all distinct varieties, and gathered from the open air. Mr A. Fowler, Castle Kennedy, sent a plant of a new *Ageratum* of a similar habit and quite as floriferous as the well-known dwarf variety, Countess of Rothes, but with rosy-tinted flowers. A seedling *Godetia*, with darker flowers than *Whitneyi*—raised by Mr J. Webster, Gordon Castle—was much admired. It has a dwarf, dense habit of growth, a brilliant colour, and seems to be a remarkably free flowerer. A seedling of *Lobelia speciosa*, with snow-white flowers, was exhibited by Mr Robertson, Sea-Cot House, Leith. This plant, though by far the best white we have yet seen, had a somewhat rambling habit of growth,

doubtless caused by its being grown under glass: it will probably be all that could be desired in the open air as a bedding-plant.

Among the other exhibits were collections of cut blooms of herbaceous plants from Messrs Dickson & Co., including several species of *Yucca*, *Colchicum autumnale*, purple and white, *Statice Fortunei*, a showy and distinct-looking plant with loose panicles of yellow flowers, *Lobelia syphilitica*, a pretty North-American blue-flowered species, *Anemone japonica* with large red flowers and its variety *alba* with flowers pure white, several of the autumn Asters, *Tritomas*, &c., &c. Mr Robertson Munro had a large array of a similar character, in which were the single-flowered Dahlias *glabrata* and *crocata*, *Stenactis speciosa*, with showy purple flowers, *Rudbeckias* of various sorts, *Mimulus cardinalis*, &c., &c. Blooms of a red Pompon Dahlia grown at Piershill were also shown by Mr Munro, who stated that the plant from which they were gathered had been growing in the open border for twelve years without being once lifted, that several varieties had been planted at the same time, but that all the light-coloured and large-flowered sorts had died out, leaving only the plant which had borne these flowers.

The Chairman alluded in feeling terms to the death of Mr John Caie, gardener, Inverary Castle, one of the most enthusiastic members of the Association.

The usual votes of thanks terminated the proceedings.



THE TELEPHONE IN HORTICULTURE.

MESSRS DICKSONS & Co., Nurserymen and Seedsmen, Edinburgh, have established telephonic communication between their seed warehouse in Waterloo Place and their Pilrig Park Nursery, Pilrig Street—a distance of fully a mile. The instrument they have adopted is Crossley's Patent Transmitter, which is one of the best for using in towns, where the noise from the street traffic renders the ordinary telephone of little practical value. It must prove highly advantageous to Messrs Dicksons & Co., bringing as it does the two branches of their business into instant communication. So far as we know, this old established firm is the first in the trade that has taken advantage of this recent invention.



DRUMLANRIG GARDENERS' MUTUAL IMPROVEMENT ASSOCIATION.

THE last session of this Association was one of the most successful in its history. The attendance was so good, and the discussions so enthusiastically entered into, that the fear of our ever falling into a "mere mechanical routine," has been scattered to the winds. We are now under full sail in the eighth session, and if the splendid breeze with which we started will only continue to fill our canvas, we shall be able to present a very favourable account of our voyage next year. The following is a list of the subjects on which papers were read: Hardy-fruit culture; the Sweet Violet; the Grape Vine; Nature; the Cape Heath; the Banana; the Asparagus; the Chrysanthemum; the Classical Planting of Trees; Stove-Plants; Benefit Societies; Water; the *Cypripedium*; Inequality of Rank and Condition; Reading; the Gathering and Storing of Fruit; the Creation; the Fuchsia; Propagation and After-treatment of Bedding-plants; Civilisation; Forcing Vegetables; The Conservatory; Savings Banks; Foremen and Workmen; Value; the Hardy Heath; Storing Ice; Formation of Vine-borders; Are the Joys of Labour sweeter than the Gifts of Fortune? Calendar for May; the Art of Thinking; Carnivorous Plants; Soils, their Management and Improvement; Hedges; Spring Bedding.

SECRETARY.

NOTICES OF BOOKS.

THE HEREFORDSHIRE POMONA. Edited by Robert Hogg, LL.D., F.L.S.
London: David Bogue, 3 St Martin's Place; Hereford: Jakeman & Carner.

The second part of this magnificent work more than maintains its high-class art in the splendidly executed chromolithographs of Apples and Pears. We have never met with such faithful representations, on paper, of the fruits with which this work is illustrated. The blemishes are as faithfully represented—where they exist—as any other features. Perhaps any one who is not acquainted with the high colour which the sunny south lays on the cheeks of the Foxwhelp, Pearmain's, and other Apples—as well as on some Pears, such as Flemish Beauty—may be inclined to think the colour overdone. Such, however, is not the case. The letterpress opens with a chapter on "Apple Lore," from the pen of Henry S. Bull, M.D. Then follows a high-class engraving of John, first Lord Viscount Scudamore, with a sketch of his life, from which it appears he took great interest in all rural affairs, including orchards—also written by Dr Bull. Then there is an engraving of the present celebrated Cordon Pear wall at Homelacey, now in the occupation of Sir Henry C. Scudamore Stanhope, with the details and results of the system as practised at Homelacey, which is well worth the attention of all who have walls to plant with Pear trees. This portion of the work is from the pen of Sir H. C. S. Stanhope, who takes great interest in fruit culture. Then the number closes with coloured figures and other engravings of forty-one different kinds of Apples and Pears, with their history and description, by Dr Robert Hogg. This second part of the great work is altogether a magnificent and very instructive one. It ought to be in the hands of every proprietor and cultivator of these fruits. We would again express the hope that so fine a work should not conclude by giving merely the Pomona of a county. It is most desirable that it should be national.

BURNHAM BEECHES. By Francis George Heath, author of 'The Fern World,' &c. Sampson Low & Co., London.

A very interesting description and history of a piece of most beautiful sylvan scenery in Berkshire, celebrated for its old and most romantic-looking Beeches, lately acquired by the Corporation of London for the permanent enjoyment of the public. The suggestion—to acquire and preserve for the above purpose—was originally suggested by the author, who has in the little volume done his best, by pleasant writing, graphic descriptions, and engravings, to make the public acquainted with the enchanting place—Burnham Beeches.

THE GREENHOUSE. By the Editor of 'The Floral World.' Groombridge & Sons, London.

The object of this work is to represent, by coloured figures and engravings, the more popular greenhouse plants; and by practical treatises on the culture and management of greenhouse plants, the Camellia, the Azalea, the Fuchsia, &c., have been treated of. Altogether the work is well executed. It is issued in monthly parts, and is well suited to amateurs in particular.

Calendar.

KITCHEN-GARDEN.

THE present time is favourable for noting the kinds of vegetables which have proved satisfactory during the past season. They may be committed to paper systematically, and when the seed-list is formed, those which are most worthy may be retained as the favourites for next season. A scheme may also be formed so that arrangements may be made for next year's cropping — trenching and manuring accordingly. The haphazard method of manuring and cropping gardens is very objectionable: by it a less supply is obtained, labour is increased, and disorder is a sure accompaniment.

Trenching may now begin, ridging up the soil to the weather. If the subsoil is tenacious clay, it should be well turned over in the bottom, and not brought to the surface, except the latter be rich and light soil; the stronger soil would then be an advantage if brought up in small proportion — and so would sand be to strong clay. But in well-cropped gardens there will be little vacant ground to turn up for some time to come. A general preparation may now be made to meet all requirements during sudden changes of weather, as it often happens after a wet season severe frost sets in suddenly. We remember what followed the cold and wet summer of 1860 — a season only second to 1879 for untoward weather, — the intensity of the frost became a household word; but the great mischief was from unripened growth; and the softness and juicy nature of all vegetable productions succumbed to the severe and sudden change which took place at the end of the year. A quantity of Fern-litter, hay-bands, old mats, wooden shutters, frames, and every kind of protector, may be ready for use at the shortest notice, as frost gives so little warning. Lettuce and Endive may be lifted into frames, with good balls of earth at their roots, placed closely together, the roots covered nicely with soil, giving water as planting goes on, and placing dry soil over the surface. They will keep in this way for many weeks and give little trouble. Young planta-

tions or successions in the ground should be in a dry position, as damp does more harm than frost. Celery, after being earthed up, may have a quantity of litter or Fern placed over and among them, without breaking the stems or leaves; but only while frost lasts should the covering remain on, as damp harboured about Celery rots it very quickly. Artichokes (Globe) should have litter placed round the collars and over the roots of the plants: the Jerusalem kind may have litter thrown over a portion in the ground, so that they may be lifted when wanted during severe weather. Parsnips may also be covered in this way; but a few weeks' supply of both, lifted and placed in a shed or under cover elsewhere, and a quantity of straw thrown over, will keep them in a come-at-able state till a thaw sets in. But roots of these, and even Beet and Carrots, are better flavoured when dug fresh from the ground. The latter should be under a covering of litter, sand, or ashes, as they would not be benefited by frost.

Asparagus beds should be trimmed as soon as the stems are ripe. If there is any fear of the crowns not being matured, let the stems at first be cut only half their length. Heavy coatings of manure placed over unripened crowns are likely to do them more harm than good; dry litter or sand would be safer, and before growth commences it could be removed and a coating of rich manure forked into the surface of beds, leaving crowns and roots untouched.

Beans and Peas may be sown any time this month, when preferred to raising them under glass in pots, boxes, or otherwise. The ground should be thoroughly trenched, and the surface levelled for the seed-rows; indeed, the trenches may remain ridged between the Peas, to act as drainage if ground is wet and cold. When the seeds are sprinkled in rows on the surface of the soil they may have red-lead sprinkled over them, and where the land is heavy, a fine coating of dry soil should be laid over them before the general covering is made. Beans may

be also planted in the usual way on a dry border: Mazagan is the one generally sown at this season. These seeds should be sown more thickly at this season than during the spring and summer months. If much rain should fall, or much surface-water should lie about after thawing of snow, it is well to make outlets so that water should pass away rapidly from crops. Celery should have special attention as to this. Broccoli may still be laid down with the hearts to the north to check gross growth: better small heads than risk such destruction as overtook most of the Broccolis last year. Dust soot and fine ashes among young Cabbage crops, to check grubs and slugs; plenty of lime may be dusted among them, —sliced Turnips and Cabbage-leaves used as traps for slugs. Forcing of Peas in pots; Radishes in frames; Carrots for drawing young; and fresh Potatoes for Christmas, now well for-

ward in pots,—should have careful attention; plenty of light and air, careful watering and protection from frost, are their chief wants. The thermometer should not fall below 45° for these. Chicory should be blanched in pits, boxes with covers, Mushroom-house, or in any position where light and air can be kept from the plants. Keep Cauliflowers and Lettuce plants in frames and hand-lights growing steadily with abundance of air and light: keep the surfaces open and clean by stirring the soil. Asparagus, French Beans, and Tomatoes do well in a temperature about 55° to 60° in absence of sun. Rhubarb, Seakale, and Mushrooms may now be fairly started. Slow forcing gives the best produce. Take in successions according to demand. A steady and regular supply is preferable to a glut followed by a scarcity.

M. T.

FORCING DEPARTMENT.

Pines.—It frequently occurs that a few Pines start into fruit in October and November. These may either be such as failed to start along with others in July and August, or of the most forward of those intended for starting next spring. In all cases it is desirable to treat such plants carefully, especially if they are Smooth Cayennes, Charlotte Rothschilds, or Jamaicas, for they ripen at a time when dessert fruits are comparatively scarce. If possible, let them be put into a division of a Pine-pit by themselves where they can have as much sunshine as possible, a bottom-heat of 95°, and an air temperature of 65° in cold and 70° in mild weather, at night, with a rise of 10° by day with sun. All fruit now swelling off should have a bottom-heat of 90° to 95°, and a night temperature as recommended above. Keep the air genially moist, and the soil regularly damp without being wet. All fruit that begin to colour after the middle of this month should be kept comparatively dry, especially if the weather be, as it usually is, damp and sunless. Large fruit in particular are apt to begin to decay at the heart before they are fully coloured if kept too wet. A little air should be admitted on all favourable occasions where fruit are ripening. All Queens

intended for starting soon after the shortest day should be kept dry and quiet. 60° should not be exceeded as a night temperature; and a few degrees lower will be better than hard firing in cold nights. Put on a little air in the pits when they exceed 65° with sun or fire-heat by day. If the bottom-heat is supplied by hot-water pipes, and the plunging material be shallow, see that they do not get injuriously dry. If the plunging material be moist, and the bottom-heat does not exceed 80°, there is not much fear of over-dryness. Look carefully over the suckers that are well rooted in 6- and 7-inch pots every week, and do not allow any of them to get over-dry, or they may get set and start instead of growing on in spring. See that they are not crowded, for if they are, they become "drawn" and weakly, and never do satisfactorily afterwards. Keep these at 60° at night, with 80° of bottom-heat, with a few degrees less when the weather is cold. Recently-potted suckers should have a bottom-heat of 90° and 65° of an air temperature till they are tolerably well rooted. All Pine-pits that can have a covering of canvas or frigidomo put over them in severe frost should have such covering prepared for them instead of hard firing.

Grapes.—Look frequently to all Grapes now hanging, and remove every berry that shows signs of decay before it spreads. There should not be a plant under the Vines that requires watering; and everything about the Vinery should be kept dry. To this end put some extra heat into the pipes on fine days when the houses can be freely ventilated. At other times range the temperature about 50°, unless when frosty, when a few degrees less will suffice. On damp foggy days, keep the ventilators shut. Remove all leaves that are ready to drop, so that they do not cause damp and impede the free circulation of air about the branches. All Vines intended to be started before the end of February should now have a covering put on whatever portion of their roots is outside, if this has not already been attended to. It is, however, undesirable to have any portion of the roots of such Vines as are started before the New Year in outside borders at all. The earliest Vinery should now have a bed of leaves and stable-litter put over the inside border, a portion to be turned daily as it heats. There is no more certain way of maturing a strong regular start at so early a season. It is not, however, now so necessary to start Vines before the 1st December as it used to be. The fine late-keeping varieties and the Grape rooms render this early start less necessary. Prune all Vines from which the leaves have fallen and from which the fruit is all cut, and clean the Vines and Vineries, and put everything in readiness for starting them when the time comes. All Vines that have shown signs of exhaustion should have the top soil removed down to the roots, replacing that which is removed with fresh open loam, liberally mixed with bone-meal, to the depth of 6 or 8 inches, and then lay over all 4 inches of rich half-decomposed litter from a horse loose-box or cow-yard. The drainage being good, this will very much stimulate the Vines, not so much next summer, but the year after. If soil for new Vine-borders has not been collected, let it be done at once, and in as dry a state as possible, and protect it from rains till it is watered.

Peaches.—Trees in late houses on which leaves are hanging should have a whisk twice a-week with a broom to bring off such leaves as are ready to drop. Those that are to be started next month should be pruned and tied, and everything about the house and border prepared for starting. Any trees showing a retrograde tendency should be treated as directed for Vines. Where new borders have to be made and young trees planted, such work should be completed without delay; and any young trees that have grown too strong last season should be carefully lifted and replanted, if this has not been attended to previously. All trees in unheated houses are late, and it will be later than usual before they drop their leaves.

Figs.—If any Figs are yet to ripen on the latest trees bearing their second crop, the atmosphere should be kept rather dry and the temperature at 60° at night. Prune and tie the early trees; and if they are old free-bearing trees, apply a rich top-dressing to the border; and if the root-run be limited, so much the richer should the dressing be. Any young trees that are growing too vigorously should be partially lifted and root-pruned, and have nothing richer than pure loam laid on the border.

Cucumbers.—The days being now short and dull, the temperature at night should recede to 70° when mild, and 65° when cold, with a rise of a few degrees by day, especially when there is any sunshine. Water in the soil and moisture in the air must be regulated by the brightness or reverse of the weather. Give a little air on all fine days. Remove all deformed fruit, and do not allow the plants to bear many at once. Stop young shoots, and keep a look-out for thrip and greenfly, and keep them down by the usual means. If mildew appears, dust the affected parts with sulphur, and keep the air drier till it is conquered.

Strawberries in Pots.—These should no longer be exposed to heavy rains, and if possible should be plunged in cold frames where they will not get dry at the root, and need but little attention in the way of watering.

Notices to Correspondents.

All business communications and all Advertisements should be addressed to the Publishers, and communications for insertion in 'The Gardener' to David Thomson, Drumlanrig Gardens, Thornhill, Dumfriesshire. It will further oblige if all matter intended for publication, and questions to be replied to, be received by the 14th of the month, and written on *one side* of the paper only. It is also requested that writers forward their name and address, not for publication unless they wish it, but for the sake of that mutual confidence which should exist between the Editor and those who address him. We decline noticing *any* communication which is not accompanied with name and address of writer.

MESSRS KENNEDY & CO., DUMFRIES.—Your Gloxinias are of a magnificent strain, quite equal in colour and substance, with few exceptions, to the best named varieties. The robustness of habit, and the way in which the foliage thoroughly hides the pots, is a great recommendation to them. When grown another year, and they are stronger and larger, they will, of course, be improved.

A CONSTANT READER.—Not being possessed of the horticultural transactions in which Mr Knight's practice is detailed, we cannot give you the information you ask for.

C. L. C.—1, *Phytolacca decandra* ; 2, *Tricyrtis hirta*.

MUSCAT GRAPES, KENT.—See that your Vines, having all their roots inside, do not suffer for want of water. Remove the surface-soil down to the roots, and then cover them with 4 inches of fresh turfy loam, mixing with it half a bushel of bone-meal to every cubic yard. In spring lay over this 3 inches of fresh horse or cow droppings, and during summer water with guano at the rate of two ounces to every gallon of water. If, as you seem to suspect, poverty is the cause of your Vines being so weak, this will put some fresh vigour in them.

DAVID PATON.—Your Seedling Grape very much resembles Buckland's Sweetwater in appearance, but it is much superior in flavour. As you say it is an early variety, it is likely to be a useful Grape. We would advise you to submit it another season to some public test.


MALCOLM BLACK.—1, Black Morocco ; 2, a Cape Heath, too much withered to name ; 3, *Nephrolepis pectinata* ; 4, a *Ruscus*, but cannot say which from specimen sent ; 5, *Adiantum trapeziforme* ; 6, quite shrivelled up—looks like the point of an *Aralia*.

THE GARDENER

DECEMBER 1879.



A FEW WORDS ABOUT ORCHIDS.

HERE cannot be a doubt as to which family of tropical plants is the most popular at the present time. Orchid-culture has extended by "leaps and bounds" during the last decade or two, and their star is still in the ascendant. Amateurs who cultivate plants for recreation, and who enjoy the labour of tending them with their own hands, have taken to Orchid-culture in no inconsiderable numbers. In a great many villa-gardens of comparatively small extent, Orchids have become a specialty. They are imported by almost, if not quite, the million, and find a ready sale at what must be remunerative prices, — and the cry is, still they come, and still they sell. One large nursery establishment, we are assured, could not make their general plant trade pay, apart from its house-upon-house full of Orchids. Another nurseryman tells us he can sell Orchids very often when he cannot sell anything else, and rarely ever sends an Orchid in bloom to an exhibition that he does not sell there and then. When any large and valuable collection of Orchids is brought to the hammer on account of the decease of its owner, or from any other cause, fanciers come from nearly all parts of the country to pick up good plants or good varieties at very high prices. We hear of a *Vanda* being bought for 100 guineas, a *Lycaste* for somewhere about 50, and an *Angræcum* at a similar price; a *Masdevallia* for 30, and a morsel of a fine *Vanda cærulea* at 10 guineas, and so forth.

Can this state of things be indicative of good taste, and, as in the case of superb paintings, a taste that is likely to be lasting? In plants, as in most things, there is no doubt something in fashion, and

often it carries its devotees beyond the limits of good taste. If a love for that which is interesting, singular, and curious in form and life, of the most exquisite blendings and tintings, strikingly distinct and brilliant in colouring, be good taste, then assuredly no family of plants can gratify and whet it more than that of Orchids. It must be admitted that many of its members when not in bloom are not graceful, but ungainly and rustic—not much better at times than a bundle of bare stems—as, for instance, the large genus of *Dendrobiums*; yet some of these bear among the most beautiful of flowers, compensating at one season for their rather uncouth aspect at another. To the lovers of the curious and interesting in form, what other family can provide so much gratification as is to be found in a great number of the Orchid family—such, for instance, as *Peristeria elata*, *Angræcum sesquipedale*, *Anguloa Clowesii*, *Cypripedium caudatum*, not to enumerate dozens more? What can excel or equal, both in interesting formation and exquisite colouring, such as *Cattleya oxoniensis* (if not *the* most splendid of all Orchids, certainly *one* of the most splendid of Orchids, and very fragrant), *Cattleya labiata* and its varieties, and *Dendrobiums* too numerous to name? Then there are the delicate tints and blendings in the *Aërides* and *Saccolabiums*, the elegance and colouring combined in the best types of *Odontoglossum Alexandræ*, *O. pescatorei*, *O. cirrhosum*, the massive size and delicacy of colour of *O. vexillarium*, the purity of the grand old *Cœlogyne cristata*, not to mention *Phalæ-nopsis* and many others as celebrated for their lively colouring as for their remarkable formation.

A pretty good case could surely be made out for a taste that revels in such plants, and its growth and extension is a matter to be desired; and such is likely to be the case, seeing that our swift steam-vessels and the short cuts now available make it possible to land Orchids on our shores in much finer and fresher condition than was possible at one time not very far distant. As a whole, Orchids can now, no doubt, be purchased at lower prices than fifteen or twenty years ago. Still superb varieties of popular genera never were higher priced, simply because the number of buyers of “crack” varieties are now more numerous; and considering the wealth of the country now, few things offer a better investment from a commercial point of view than first-rate varieties of Orchids.

A circumstance which has to a considerable extent of late induced many to begin their culture, is the fact that some of the very finest tropical Orchids have been grown under much cooler treatment than was at one time dreamed of. Many of the most beautiful hail from the high lands of the Americas, and not only thrive, but thrive by far the best, in a temperature not much above what is necessary for a mixed collection of greenhouse plants. Thus their beauty can be much more enjoyed by all, and by many who cannot for many minutes put up with a roasting tropical heat.

Looked at from what may be considered a utilitarian point of view—namely, the supply of cut-flowers for various purposes—some Orchids stand unrivalled. Few if any blooms last so long in rooms after they are detached from the plants. Apart altogether from their beauty, this is a most important recommendation. Given a glass-house, what can be grown in it that will yield a more plentiful crop of flowers at a season when they are scarce, and valued, than such as *Dendrobium nobile*, *Cœlogyne cristata*, *Lælia anceps*, *Lycaste Skinneri*, *Odontoglossum Alexandræ*, *O. pescatorei*, *Cypripedium insignis*, *Phaius grandiflora*, *Calanthe Veitchii*, *C. vestita oculata rubra*, *Zygopetalum Mackayii*, *Pleiones*, not to mention many others, none of which rank among the very high-priced? Moreover, they can all be grown in the same house—in a most enjoyable temperature—by keeping those of them which hail from the warmest latitudes at the warmest end of the house, and those which are from higher and cooler quarters at the coolest end. None of them require a high temperature to grow them perfectly well. Neither are any of them ranked among those which are difficult or troublesome to manage; and we have no hesitation in affirming that, at the dead of winter, there is no other plants that are so useful for cut-flowers, or more interesting in all respects. Most of those named above last a long time in an ordinary sitting-room. *Calanthes* remain fresh, opening their unexpanded blooms, for six weeks, and the *Cœlogyne* for a month. Any one who has half-a-dozen good plants of *Dendrobium nobile* can afford to cut an entire bloom-stem, and does not need much besides a few sprigs of Fern to make a vase or glass look charming for a considerable time. They have also the merit of packing and carrying well; and no box or case of cut-flowers can be considered complete without a few Orchids.

Nearly all those named, and many more besides, thrive well in potting material composed of equal parts of the fibry part of peat and sphagnum. The temperature required for *Dendrobes*, *Phaius*, *Calanthes*, and *Lælias*, is a little higher than for the others, and they should be at the warm end of the house, the *Cœlogynes* and *Lycastes* at the middle, and the *Cypripediums* and *Odontoglots* at the coolest end. In cold weather, 55° to 60° is sufficient for the former, and 5° less for the latter. By a little difference in the extent of flow-pipes next to the boiler, and by keeping the cool plants at the east end of the house, a difference of 5° can easily be arranged without a division. Of course it is always best when two compartments are at command; but these remarks are made in the interest of many who cannot have two divisions devoted to Orchid-culture.

Beginners would get most useful and sound instruction from such works as Williams's 'Orchid-Growers' Manual' and Burbidge's 'Cool Orchids.'

Subsequent to writing these remarks, we have enjoyed an opportunity of inspecting five collections, or rather selections, of Orchids, all of which are

well known to a great many Orchid-growers. As we have referred specially to this family of plants as possessing a singular charm for amateurs who do nearly all the work connected with their culture, we will first briefly refer to Dr Paterson's Fernfield, Bridge of Allan, as an example of what can be accomplished with the most commonplace—in fact, what many would consider inferior—appliances. The houses at Fernfield consist of three very small compartments, without any divisional doors. The plants embrace the finest varieties in cultivation of some of the genera, all in so robust and healthy a condition as is rarely met with—indeed we never saw a lot of Orchids so exceptionally healthy. To give some idea of the coolness of temperature and airy condition under which these Orchids are grown, it will be sufficient to state that, when we approached the garden at Fernfield, on the 13th November, the first thing we noticed was the door of the cool-Orchid apartment standing wide open, and spikes of *Odontoglossum*, *Masdevallias*, *Oncidiums*, *Lycastes*, &c., waving about with the current of cool air. In the next division were such as *Cattleya labiata*, *Lælias*, *Miltonia Morreliana*, *Vandas*, &c., in bloom, also subject to the free circulation of cool air—for there is no door on the opening between this house and the cool division. In the third apartment there were *Aërides* and *Saccolabiums*, in the most perfect health, and a grand spike of *Vanda cærulea*, bearing fifteen very large and finely-coloured blooms. We had been aware, previous to our visit, that the Doctor always had his doors open all day in summer, except in cases of high winds, but were completely taken aback to see the door of the cool house stand open for five or six hours on a clear bracing November day. The treatment of these Orchids is exceptionally cool; and the Doctor attributes his great success chiefly to a free circulation of air and moisture in proportion.

At the time of our visit the following were in full bloom :—

<i>Ansellia africana</i> .	<i>Odontoglossum pescatorei</i> .
<i>Anthurium alba</i> .	„ <i>Alexandrae</i> .
<i>Cattleya labiata</i> (grand variety).	„ <i>Bictonense</i> .
<i>Cypripedium Sedenii</i> .	„ <i>uro-Skinnerii</i> .
„ <i>insigne</i> .	<i>Oncidium ornithorhynchum</i> .
<i>Dendrobium chrysanthum</i> .	„ <i>varicosum</i> .
„ <i>speciosum</i> .	„ <i>crispum</i> .
<i>Epidendrum vitellinum majus</i> .	„ <i>serratum</i> .
„ <i>falcatum</i> .	<i>Pleione maculata</i> .
<i>Gongora atropurpurea</i> .	„ <i>Wallichiana</i> .
<i>Lælia anceps Barkeriana</i> .	„ <i>lagenaria</i> .
„ <i>Perrinii</i> .	<i>Sophronitis grandiflora</i> .
<i>Lycaste Skinnerii</i> (immense blooms).	„ <i>cernua</i> .
„ <i>lanipes</i> .	„ fine lake-coloured imported variety.
<i>Masdevallia ignea</i> .	<i>Vanda cærulea</i> (splendid variety).
„ <i>Veitchii</i> .	„ <i>suavis</i> .
„ <i>Harryana cærulescence</i> .	„ <i>tricolor Patersonii</i> (grand variety).
„ <i>Lindenii</i> .	
<i>Mesospinidium vulcanicum</i> .	
<i>Miltonia Morreliana purpurea</i> .	

On the same occasion we visited Mr Smith's, of Bretby Park, Stirling, where the nucleus of a fine collection has already been got together; and plant-houses, now occupied with mixed collections of plants, besides a new house in course of erection, are to be devoted exclusively to Orchids. Here we saw the lovely *Lycaste Skinnerii alba*, in bloom, and various others. At John Gair's, Esq., the Kilns, Falkirk, a large collection of Orchids is being formed, and several houses are devoted to their culture; and the plants are in a thoroughly promising condition. It is only a year or two since Mr Gair took to Orchid cul-

ture, and on that account most of the plants are comparatively small, but are thriving remarkably well. A plant of *Odontoglossum Londesboroughianum* was just opening, probably the first time of its blooming in Scotland. At John Russell's, Esq. of Mayfield—a place which has long been justly celebrated for many of the finest specimens in cultivation, but which were dispersed a few years ago—we were greatly surprised to find all the Orchid-houses again full of Orchids. We presume Mr Russell could not take to a new line, and so has gone with all his heart into his old one. Although the specimens here are yet far short of what the old ones were, they are on the road to a similar success, under the able management of Mr Sorely, Mr Russell's gardener. Many interesting specimens were here in bloom, but being "tied" to a train, we took no notes. The most extraordinary growths of *Dendrobium Wardianum* we ever saw were here. They were quite 3 feet long, and as thick as a man's forefinger. At A. B. Stewart's, Esq. of Langside, we found that great strides have been made in Orchid collecting and culture during the last two years. A grand plant of *Cattleya oxoniensis* was here in fine bloom, the real *Phalenopsis grandiflora*, and many others. The finest plant of *Vanda Lowii* in the country is in this collection. We found the general tendency to use more sphagnum, and less lumpy peat, in Orchid culture, than was the case at one time in force at all these places; and we think, from our own experience, this is a step in the right direction. The treatment generally is also much cooler, as we before remarked, than was at one time practised.



RESTING AND WATERING PLANTS.

PLANTS generally will be safely located in their winter quarters, many of them, we fear, in a backward state, and by no means so well prepared to withstand the winter as in many previous years. The wood of numerous flowering subjects that require thorough ripening and a fair season of rest, especially those that have done duty late this season—such as *Allamandas*, *Bougainvilleas*, *Clerodendrons*, &c.—will need every attention in thoroughly maturing the wood. Owing to their premature state, a slower process must be adopted in bringing the plants safely to rest, otherwise fatal results must be anticipated. Considering the immature state of both flowering and foliage, extra caution will this year have to be exercised. Plants of the fine-foliage type that had completed their growth by the end of October last year and before this time, were enjoying that season of repose which is expedient for the wellbeing of many subjects. An early rest, if time is an object with the cultivator, is the only means necessary to insure an early start again at the commencement of the year. The dull and sunless season, combined with a downpour of rain that is now fast drawing to a close, has been unfit to solidify the growth of plants, and bring them to that satisfactory stage of maturity to receive an early slumber. If artificial means have not been adopted to assist in their maturation, and they are allowed to keep in a semi-active state with a view of insuring an early and vigorous growth in the spring, the result ends in disappoint-

ment; and when wanted to grow, they will naturally stand still and enjoy the demands of nature. It is unwise for cultivators to adopt systems contrary to natural laws, instead of using every possible means in their power to bring plants to a stand-still artificially—not by force, but gradually, according to their constitution and requirements. The little time that may be considered lost by some growers in subjecting plants to a resting period in late seasons will be repaid by the vigorous and luxuriant growth made afterwards. Withholding water is not the only means necessary to bring plants to rest, and the ordeal of drying with many classes would prove more detrimental than beneficial. Yet a judicious use of the water-pot with evergreen plants is indispensable. To keep their roots healthy and their foliage from being injured is what is required. In other cases it is necessary to withhold water, and to maintain a drier atmosphere and lower temperature. Plants in every department need careful watering, more especially as the days shorten and growth comes to a stand-still. In many instances we have noticed plants suffering for want of water when they most needed it; while, on the other hand, it is too frequently supplied with a vengeance, and neither thought nor care exercised in its application until bad results follow, and a large amount of damage is perceptible. We would, if success is the object, forcibly urge the importance of caution in watering, and carefully examining the requirements of plants. Plants do not need so much water after growth is completed; nor in the dark short days of winter is there any agent to evaporate it so freely from the pots as when the heat and dryness of the air require so much to feed it. It is during the winter season and early spring that watering should be most carefully studied. Too frequently do we see that beautiful genus *Erica*, “which deserves to be more largely grown,” suffering in winter through the application of water in a careless manner—too much at times, then again not sufficient—which no after-treatment can rectify. Their nature, and the solidity of the soil in which they are potted, should guide us in a large measure not to give them too much. *Azaleas* of the *indica* type are plants that in many cases undergo severe treatment; and in a great measure their injury may be traced to the way in which they are supplied with water. The fine fibry nature of their roots soon becomes destroyed if negligence in watering is resorted to. These, while in an active state, are allowed to get dust-dry, and are kept on the dry side perhaps for weeks, in order, as we have heard it remarked, to bring them to rest. Under such treatment we need not wonder at so many examples being destitute of foliage, and looking more like a bundle of dead sticks through the winter than *Azaleas*. We need not wonder at them presenting such a melancholy appearance when subjected to such unnatural treatment in order to bring them to rest. In time they are brought to a long rest, and find their resting-place on the rubbish-heap. We are aware *Azaleas* shed a portion of their leaves annually; but it can readily be seen that

healthy vigorous plants only shed a small percentage compared to those subjected to a starving process. They should never suffer for want of water in any stage of development : a low airy temperature is the best possible means of inducing rest. Many of the causes attributed to the falling of *Camellia*-buds can, in the majority of cases, be traced to dryness at the root, after the buds have developed to a certain stage : they, too, should never be allowed to suffer.

As before alluded to, carefulness will be necessary in every department ; and watering, in our idea, is one of the principal points connected with the successful culture of plants. Soil may be right, temperature suitable, and houses well-appointed ; but if watering is not properly attended to, and is carelessly applied, what success can be anticipated ? It is much easier to make a mistake at this time of the year than during summer. Many plants, especially *Orchids*, require much attention in this respect : many of them are benefited by water being withheld for a long time ; while others require to be kept moist, or much damage is done to their foliage.

After the general potting in the spring, a close watch should be kept until the newly-potted plants get well hold of the new soil and commence growing luxuriantly. In concluding, we may add, that those in charge of the watering of plants cannot give the subject too much consideration, or exercise too much discretion through the winter and spring months.

WM. BARDNEY.



A SELECTION OF CHOICE DRACÆNAS FOR TABLE DECORATION.

THANKS to Mr Bause's skill and energy, and to others following in his wake, we have now an almost illimitable number of this fine genus of plants to choose from for the various purposes of decoration to which they are adapted. The risk now is, that we may find ourselves embarrassed by our riches, instead of being hampered—as we were only a very few years ago—by the poverty of variety of form and colour which existed then. It is quite true that for table decoration some of the older forms, such as *D. Cooperii* and *D. terminalis*, cannot yet be dispensed with. On the score of cheapness and economy they must still for some time be the principal subjects for table decoration. And it must be conceded, also, that in their own particular style as regards form and colouring they are unsurpassed ; but there are a good many varieties of recent origin which, when plentiful enough to be equally cheap, will divide and claim a large share of popular favour with these fine old sorts. Many of these novelties present marked features both of form and colouring from any of the older species, the forms being specially adapted in some to the requirements of table decoration, while the colouring is varied and beautiful, even to the eclipsing of

that of the two fine sorts above named. They have other recommendations, also, than novelty and grace, and fitness of form and colour. Not a few are slower growers, and do not therefore outgrow the dimensions generally requisite in table-plants. They also more quickly come to colour—many, in fact, exhibiting charming colouring when only a few inches high. In not a few instances, too, a greater persistency of the leaves is notable, which is a valuable feature, the want of which in *D. Cooperii* is its chief objection.

In presenting the following selection, I may remark that some old and apparently comparatively inferior sorts are included, especially amongst the green-leaved varieties. My apology for so doing is, that some of these green-leaved varieties being hardier than the more showy ones, are better adapted to the requirements of a very large class of people—especially about towns—who have only, perhaps, a small greenhouse in which to cultivate the few table or room plants they want. The two varieties *congesta* and *rubra* are handsome plants also in their way, and the latter particularly will endure the wear and tear of room-life better than any other; and, being plentiful, it is cheap, which is no small consideration with the many.

GREEN-LEAVED SPECIES.

D. congesta.—A well-known sort, of common aspect, with very narrow, green, somewhat arching leaves of very leathery texture. The young leaves, when well exposed to light, assume a deep bronze tint. This is sometimes apparently confounded with the following species, which is, however, quite distinct.

D. rubra.—This has considerably broader leaves than the last, and altogether a fuller and better habit. The leaves are a light olive-green, narrowly margined with a band of bronze.

D. gracilis is the most graceful of all the green forms, or perhaps of any form of *Dracæna*. The leaves rarely exceed half an inch in width: they are a fine lively olive-green, with a broad brown margin running the entire length from base to point. The sort called *D. marginata* and this are identical—that is, they are or may be obtained from the same stock. The top-cuttings form *marginata* true, while the successive breaks from the same stem form *gracilis* true.

D. tessellata.—Why this particular form is so called does not appear in any feature exhibited in the plant. It is a very plain green sort, capable of hard wear, but not particularly ornamental.

D. Haageana is one of the most distinct of the green-leaved sorts, having longish ovate, bright-green leathery leaves, which stand the dry atmosphere of rooms well. The habit of the plant is compact and pleasing.

WHITE AND LIGHT COLOURED SPECIES.

D. Guilfoylei.—This is a very handsome species when well coloured. As in all those remarkable for colour, the tops of medium-sized plants make the finest and most effective table-plants. The long lanceolate leaves have more than average substance in them, which enables them to stand the trying atmosphere of rooms better than most of the coloured species.

Mrs Wills.—A very dwarf form, of sturdy close habit. The leaves are ovate-

lanceolate, bright green, striped with white, the younger leaves often becoming wholly white. It proves a capital room-plant, the dense leathery texture of the leaves resisting the arid influence of rooms. It may be grown in an intermediate-house temperature, which is an additional consideration in its favour.

D. regina.—A bolder form, of similar style to the last, but generally requiring to be grown to too large a size for table-work before it acquires its fine colour. Yet when well done in medium-sized plants it is very handsome.

D. speciosa.—A very fine bold species, suitable, when well grown, for contrasting with the darker-leaved varieties on large tables or sideboards. The habit is rather erect, the foliage broad and long-margined, and striped with white, the youngest leaves becoming often pure white, the leaf-stalks and margins of the leaves showing a clouding of rosy-purple.

D. terminalis alba.—Having the habit and form of the leaves of the old *D. terminalis*, with more substance, this is a decided acquisition among white-coloured *Dracænas*. It has the merit of colouring in a very young state; finely-coloured plants may be had from cuttings at 1 foot high.

DARK-LEAVED SPECIES.

D. bellula.—This is a miniature species, and adapted to purposes which no other that I am acquainted with so well suits. Very nice well-coloured plants may be grown to a foot or more high in 4-inch or even smaller pots. The leaves are about 3 to 5 inches long, closely recurved on the stem, and not more than an inch broad—deep bronze, striped with purplish crimson, and occasional bars of bright olive-green. When done in small pots, it makes a most suitable ornament for small vases.

D. Cooperii.—No list of *Dracænas* for table decoration would be complete without this old and well-known sort.

D. Ernestii.—A very handsome sort, of light, elegant habit. The leaves are lanceolate, tapering, and recurved—deep bronze-green, with broad crimson margin. The young leaves are rosy pink and cream-coloured.

D. Frederici.—This is one of the newest and best as regards colouring and habit. The plant grows to moderate size slowly, but to colour quickly. The leaves are long, stalked, and spreading. The ground colour is dark shining bronze, edged with crimson, the leaf-stalks partaking of the same brilliant colour. The younger leaves become broadly margined with purple, shading off with age into the glowing crimson of the older leaves. It is altogether one of the most effective *Dracænas* for table decoration yet introduced.

D. Mrs Bause.—A very neat and highly coloured variety, of dwarf habit. The leaves are elegantly recurved, from 9 inches to 1 foot long; they are deep bronze-green, margined and striped with deep rosy-crimson, the younger leaves being bright rose with a dash of crimson, and occasionally streaked with bright olive-green.

D. Mrs C. J. Freaks.—A very handsome variety, of free but moderate growth, and colouring early. The leaves are slightly arching, long-stalked, about 2 inches broad, deep bronzed olive-green, broadly margined with brilliant crimson.

D. nigro-rubra.—A very excellent sort for table decoration. The sort is so well known as to hardly need description. The form which is sold under the name *elegantissima* is so slightly different, if at all, as to be undesirable in the same collection.

D. Renardæ.—This is one of the newer introductions, and is a worthy one. The leaves are oblong-ovate, elegantly recurved. The ground colour is very deep olive-green with a dash of bronze, margined with crimson rose. The younger leaves are variegated in changeful style with rosy pink, cream colour, and white suffused with rose, the youngest ones being wholly of the latter combination.

D. Sydneyi.—This is of the same type as *Ernestii*, and perhaps not quite distinct enough to be desirable in the same collection. Its habit is freer and more open, and the leaves are longer and broader than in the latter, and also more erect. The colour is a deep bronze-green, in the mature leaves edged with deep rose-crimson. The younger leaves assume wholly a rosy-crimson tint, very bright and effective. It colours at a very early stage of growth, and is therefore a very desirable sort.

D. stricta or *ferrea stricta*.—This is sometimes erroneously called *terminalis stricta*, but it has nothing in common with that sort. It is a very bold, useful variety, of erect style and brilliant colour when the plants are grown rapidly from cuttings rather than eyes. It is also very serviceable, and endures well in rooms.

D. terminalis.—The last but not the least of the present selection. When rapidly grown from cuttings, this is one of the most brilliantly coloured of the whole group, and it is certainly one of the most enduring. W. S.



HARDY PERMANENT EDGINGS.

It is surprising how constantly we require to be learning. It seems that while we are ever learning, we are, at the same time, ever forgetting; and while, on the whole, we may be adding to our stock of knowledge in the aggregate, our mental notes are filed and forgotten, until now and then the eye or ear, like an index to a good book, suddenly prompts the mind that its notes can be utilised to some immediate purpose. It is hard work to think; and we may even see and not observe, consequently we slide along in an old groove, and allow others to think for us: an occasional jerk of shame, necessity, or interest is a wholesome stimulus to action. We have lately been aroused to a sense of our own short-sightedness while comparing the doings of a neighbour with our own, in the matter of hardy plants which might be used for edging or carpeting. In looking round a well-stocked wild garden, which, however, is a rarity; or a richly-planted rockery, which is rarer still—the rockery at the Botanic Gardens, Edinburgh, for instance,—a monument to the maker, and a book of reference to those within its reach—it is surprising how many plants are clearly suitable for edging or carpeting permanently, or changing annually if desired. Many of them may be poor things, so far as showy flowers are concerned, but form and habit are equally or more essential for the purpose, and, happily, form and habit are becoming equally appreciated with colour. We wish to draw attention to a few of which we have some

experience,—and first to some of the neglected Sedums. There are several which have become quite familiar to most people, of the very small *S. acre* type, such as *S. acre aurea* and *S. acre elegans*; also *S. glaucum*, *lydium*, *dasyphyllum*, and *corsicum*. But there are others equally deserving of culture, and the foremost is surely *Sedum album*, a dense-growing, reddish-green species; but its beauty is in the flowers—it is quite a flowering plant for edgings. Last summer it lasted a long time on the rockery and in borders; and many yards on the top of a high wall here were quite gay with its elegant flowers, but did not last so long as those on the ground. We intend pressing this into the flower-garden service next summer. Another bold-growing glaucous sort is at present in better condition than it has been all the summer—namely, *monstrosum*, *elegans*, or *Fosterianum*. It sometimes grows with the ends of the shoots fasciated, so called *monstrosum*. Which-ever is the right name, it is a very desirable plant in the mass, does not flower very freely, the spikes large and heavy, yellow, and best pinched off as they appear. *Sedum anacampseros* is a really elegant species, with round glaucous leaves, not unlike a small *Echeveria secunda glauca*. The stems lie prostrate on the ground like other Sedums, but the little pyramidal ends of the shoots are always erect. There is a large sheet of it hanging over a large rockery-stone here, and it is novel and elegant. It is a plant as old as any English garden. We have propagated several hundreds of it by nipping off the leafy points of the shoots and inserting them in prepared ground, and shall give it a place in the flower-beds next year. *Sedum acre aureum* is now being used to carpet beds of Hyacinths and Tulips, and we expect in the spring that the arrangement will look well. This has a tendency to turn off green on rich soil, when it fast becomes an intolerable weed. It keeps colour best when made to creep and hang over stones. Another of those Sedums, and we have done with them—*Sedum spurium* or *oppositifolium*, we are not sure. It forms a close dense mass of green, close on the ground, the leaves broad and fleshy. There are three varieties growing on blocks, stones, and the open border here. One variety is the best in colour—a dark-red; the other two are white and rose-colour, the flowers large. This *Sedum* will make a very desirable change among hardy carpet-plants; even the flowers are showy hanging over a large stone. A few hundreds put in to propagate last month in nursery lines have become quite red in the foliage, as the small *Sedum lydium* does under a hot sun. There are three of the Periwinkles, which are very neat for permanent edgings to beds—namely, *Vinca herbacea*, *V. minor*, and *V. minor variegata*—the latter a very choice plant, though all are sometimes found carpeting the ground in woods. The variegated variety is a good substitute for *Euonymus radicans variegata*, which requires rather a warm soil and climate to bring out its character. The *Vinca* thrives anywhere in sun or shade, creeping over the rockery or in the open border. The double-flowering variety of

the green *V. minor* is desirable even for its flowers, although they, from their colour, cannot be called showy against the dark-green foliage.

Few plants surpass the Ivies for permanent edgings, especially the small-leaved varieties and the gold-and-silver margined, although these last take a longer time to grow and fill up space than the green varieties. As compared with Box for kitchen-garden edgings, we are not sure whether Ivy would not be for the best on some soils where Box does not thrive. For edging flower-beds, the best plan by far is to stretch a strong wire tightly along the edge of the bed or border to be edged, if a straight line; but if curved, a light iron rod bent to the proper curvature on which to train the Ivy. Three or four inches, or six inches above the ground, according to taste or position, will do—the latter height for Roses, the shorter height for flower-beds. Plant thickly and train cordon fashion, and very soon a neat permanent edging is formed, the young side-growths of the Ivy drooping gracefully to the ground; and soon the wire is completely hid, but maintains the edging stiff and straight.

The next plant we will mention may occasion a smile; but we cannot help calling attention to its merits, since its very commonness may cause it to be passed by. *Lysimachia nummularia* is a plant often used for edging vases, notably at one of the Park Lane gates of Hyde Park many years ago. Its large showy yellow flowers have been very abundant the whole of the last wet summer. It is particularly deserving of a place as a variety in edging any dwarf arrangement, especially in moist shady places, such being the localities where it is found wild. *Sagina procumbens* is a very common plant or weed, carpeting the ground when not wanted; but common though it be, there is no plant which will form a neater, or greener, or more dense carpet than this. We have this season seen it worked into several very neat designs in carpet-bedding in a first-class garden, and again in a villa garden near Edinburgh. It really seems to deserve a place in preference to such a plant as *Herniaria glabra*, or even the tender *Mentha gibraltarica*. Readers will probably here be inclined to say that we are simply introducing weeds into the flower-garden; but we may fairly ask the question, What is a weed? Is a common indigenous plant a weed, or is it, as the late Earl Russell once defined it, any plant out of place?

THE SQUIRE'S GARDENER.



NOTES ON DECORATIVE GREENHOUSE PLANTS.

STATICE PROFUSA.

AMONG flowering greenhouse-plants this *Statice* must take rank among the foremost, both as an ornamental plant and for the profusion and enduring quality of its flowers, as they may be said to be almost everlasting. And yet, somehow, the plant is not nearly so much cultivated

as its sterling merits deserve. A good, well-bloomed specimen is a sight not easily forgotten. Yet how seldom do we see what may be called a good specimen, or even in how few places do we find it grown at all. This cannot arise from any very great difficulty in the cultivation of it, as it is no more difficult to manage than the majority of greenhouse plants. As an exhibition plant, when well grown, few things are more telling in a collection.

We believe that many growers err in coddling it too much, by growing it in heat at certain stages of its growth. A moderate heat for a short time will not do any harm, but it thrives best under cool treatment. When thoroughly established, it delights in rich feeding, and well repays any extra care bestowed upon it. Established plants should never be subjected to a higher temperature than about 50° of fire-heat: of course in summer the coolest structures will be much hotter than this, but then there will be air given in proportion.

This *Statice* is propagated by cuttings, which should be taken off, if practicable, with a heel, early in spring. They should be potted up singly at once in thumb-pots in a mixture of peat rubbed through a fine sieve and sharp silver sand in equal proportions. Make a hole with the finger, put in the cutting with some pure sand about it, then press all firmly in, water through a fine rose, and plunge the pots up to the rim in a bottom-heat of between 80° and 90°. If they can be covered with a bell-glass for a time so much the better, as it will tend to hasten the rooting process. When they are well rooted, and before getting matted in the pots, they must be shifted into 4-inch pots, using the soil in a rougher state, and a little good fibry loam along with it. The pots would be all the better of being half-plunged in the hot-bed until they begin to take to the fresh soil, when they may be stood on the surface of the bed, and air admitted in moderate quantities at first, so as to gradually harden them off, and render them fit to stand a cooler temperature than they have been enjoying.

About the beginning of June they will have been sufficiently hardened off to stand in a cold pit or frame: if in the latter, see that a good bed of ashes be under them, or set them up on inverted pots, so as to prevent worms from finding their way into them, as they are very injurious to them when they do get in. They will be all the better of a slight sprinkling with water overhead occasionally, and aired freely during the day, at the same time avoiding draughts.

About the middle of August they may want a shift into larger pots, which may be 6-inch ones, and this will be quite large enough for them the first year. The same kind of soil to be used, only rougher, and some good old cow-dung may be incorporated with it, and a little put over the crocks as well. Keep the flower-stems picked off as they appear, so that all the energies of the plant may be directed towards making a good foundation for the future specimen. They must be carefully watched in regard to watering, so that they may not suffer for

lack of it, else they will soon be visited by their two great enemies—spider and thrips. On the other hand, care must be taken that they are not over-watered, so as to render the soil sour or sodden, else they will soon get into bad health; and, like many other plants, it is easier to put them into this state than to resuscitate them when once they have fallen into ill health. An ordinary greenhouse is the best place in which to winter them. They must be kept gently on the move, not allowed to rest by allowing them to become dry; but water may be more sparingly applied during the dull winter months, and fresh air admitted on every favourable opportunity. During the second and succeeding years, if large plants are wanted, they must be encouraged as much as possible. They will be ready for a shift into 8- or 9-inch pots early in February. A liberal allowance of old cow-dung may be mixed with the soil, and a layer of it put over the crocks. Continue to shift them as they require it, and in potting press the soil pretty firmly about the ball.

Unless for very large specimens, 11- or 12-inch pots are large enough for handling, and a good large plant can be grown in this size of pot. The stamina of the plants must be kept up by surface-dressings of old cow manure and waterings of liquid manure. Of course these need not be applied until the pots are well filled with roots; and with care and proper attention, plants may be kept in good health in these same pots for many years. It is not absolutely essential that peat should form the chief part of the compost, as they will thrive equally well in loam, provided it be good and have plenty of fibre in it. A few pieces of charcoal will be an advantage in helping to keep the soil open and sweet. Always make sure that the drainage is in good working order and the plants kept clean. These remarks have been confined to the *Statice profusa*, but they apply equally to the other varieties. It is seldom, however, that we see more than it and *Holfordii* grown.

J. G.



NOTES FROM THE PAPERS.

YOUR highly respectable contemporary, the Irish 'Gardeners' Record,' we would recommend to the attentive perusal of the horticultural press generally—it is worth watching. It is difficult to feel anything but commiseration and sympathy for a journal that has to pack its pages promiscuously with paragraphs about such subjects as "Holloway's Pills," which, the 'Record' states, in a chatty way, "are as mild as they are efficacious." This statement is not given as an advertisement, and so we expect its editor has tried them. There is no harm, of course, in a grateful acknowledgment of this kind; but it is different when the 'Record' appropriates whole chapters from its contemporaries without acknowledgment, simply because it appreciates them as it does the pills. We observe that it has transferred that chapter of the "Squire's Gardener's" on "Mixed Flower-Gardening," from 'The Gardener' to its own pages without so much as "By'r leave, sir." Robbing the ample stores of 'The Gardener' is

perhaps not so heinous an offence ; but what is any one to think of the same paper abstracting matter in the same way from the pages of its humble contemporary 'The Villa Gardener'? Is it not too bad? It is the old story of the big dog robbing the little one. In the same number of the 'Record' is an unacknowledged article on "Epidendrums," which appeared in the 'V. G.' of August last. There are also articles on one or two other subjects we should like to know the parentage of. [We do not care much about being quoted without acknowledging the source, but we are sorry to think that any gardening journal is capable of so doing.—ED.]

The prophets are again speculating on the chances of a severe winter. If, as they assert, bad winters follow cold and wet summers, then the ensuing winter ought to be a severe one. It has not set in yet, however, with us. October was exceptionally fine ; and November, up to near the middle of month, has been as pleasant almost as the month of June. Contradictory accounts come from other countries. Among the vineyards of Austria heavy snow fell early in October and destroyed the hopes of the growers. In far-away Iceland, on the other hand, within the Arctic Circle, the inhabitants have been basking under an almost Italian sun till late in the season, and some had nothing to complain of all the summer but the heat and the drought.

According to all accounts, many kinds of flower-seeds are likely to be both scarce and dear next season. Mignonette seed is all but a complete failure ; and those who require it by the ton, we hear, have a difficulty in getting anything like their usual quantity, and holders are reserving their stock. The failure of the potato crop has been complete in this country ; but the fear of a potato famine is groundless, as the Continental growers are contributing abundant supplies. Potatoes are dear, however, and likely to be. The variety called *Magnum Bonum* seems to have resisted the disease better than any other—to be almost disease-proof, indeed, if we are to believe what has been written about it in most of the gardening and agricultural papers. Dealers are buying up stock of it for seed, and no doubt it will have a good run.

We have rarely seen anything that has pleased us so much as those lines in 'Good Words' on "The Cloudberry." The style is something between Tom Hood, in his more serious moods, and Wordsworth :—

"Nay, touch it not ; 'tis the Cloudberry bloom,
My friend, you and I have found,
On this far height, 'mid the soft June winds,
Pale-white on the mossy ground.
Ah ! rarely 'tis seen by the eye of man ;
By us let it not be soiled ;
The sprites linger long on the mists of the morn
To watch it ope on the wild.

High 'neath the clouds thou bloomest alone,
Lost flower of the moorland free ;
Thy homage the circling peewits cry,
And the hum of the mountain bee.

Bloom fairer than thee I ne'er have seen
On dale or on hill I've climbed,
And ne'er have I known a darker birth
By the power of heaven sublimed !"

The ignorance displayed by eminent public men occasionally on the subjects of which they speak is perfectly astonishing. A certain noble lord, in a speech delivered by him before an agricultural society in the south, gave it as his opinion that the climate of Great Britain was deteriorating, or becoming colder; and, in support of this opinion, stated that neither the Bay nor the Arbutus, among other things, would now stand our winters without protection; and that the Camellia, which once used to be hardy with us, is now not to be seen out of doors! It need not be pointed out how much the noble lord is in error about the two first; and if he had been a reader of these papers, where he could have procured more accurate information on such subjects, he would have known that there was never a time when the hardiness of the Camellia was better recognised and acted upon, and that it has scarcely ever been known to be killed by our winters.

The 'Garden' says: "Mr Peter Henderson recommends, in the 'American Agriculturist,' a flower-pot with holes low down in the side instead of in the bottom. We have, he says, during the past six months tried about a thousand, of sizes ranging from 3 inches to 6 inches in diameter, and find they are all we expected of them. All cultivators know the difficulty experienced when the ordinary flower-pot is placed on a bench covered with sand or soil—the outlet often becomes completely closed by the washing of the soil through the outlet, and being closed by the sand, the drainage becomes stopped as completely as if there was no orifice at all in the bottom of the pot. Again, worms breed quickly in the sand or soil, and seem to take a special pleasure in crawling under and through the holes in the bottom of the pots, to get at the rich soil which they contain. This improved pot is safe from the first difficulty, as the holes, being on the sides of the pot, cannot be clogged by the sand; while it is far less tempting to the worm, as a special effort must be made before the hole can be reached. Still another advantage—and we think a very important one—is, that as these orifices are placed above the bottom, air is admitted more freely to the roots, a matter which is very essential to the wellbeing of plants. I have but little doubt that if this style of flower-pot can be as cheaply made, it will quite throw the old style out of use."

Flower-pots with holes at the side, close to the bottom, are not new; and we believe it was the Glasgow makers who first made them, at the suggestion of the late Mr Charles M'Intosh of Dalkeith, but the plan was only adopted with pots above the size of 6 inches or thereabout. Those pots had holes in the bottom too, however, and it appears a good suggestion of Mr Henderson's to dispense with these altogether, for the reasons he states. There would be less danger then of worms getting into the pots, or of the drainage being choked up; but how about those plants that are sometimes allowed to root through the bottom of the pot?

The 'Journal of Horticulture' says: "It is not perhaps generally known how valuable the pretty variegated *Ophioglossum spicatum* is for table and room decoration. When the plants are grown in a little heat the foliage assumes a more upright character than is generally seen, and as it then gracefully arches the plants are extremely attractive. The narrow leaves are clearly margined with white, and being smooth and persistent endure the dry air of rooms for a considerable time without being injured. Well-grown plants are equally useful for the margins of greenhouses and conservatories. When flowering, the purple Grape Hyacinth-like spike contrasts effectively with the white foliage; but whether in or out of flower the plant is very useful for decorative purposes. As testimony of the increasing popularity of this Ophio-

glossum we recently observed a batch of plants in Messrs Veitch's nursery, a great portion of which were labelled 'sold.' Visitors have seen, admired, and purchased them."

Plants that "go off" amongst gardeners usually turn out to be popular subjects of general culture.

READER.



FLOWER-GARDENING NOTES.

THANKS to the fine autumn weather, flowering bedding-plants have late in the season somewhat retrieved the bad repute they got into throughout the summer and early autumn months. At present date (November 10) Geraniums are still blooming freely, but tender subjects, such as Ageratums, Iresines, &c., have been destroyed by frosts; and the arrangements have, notwithstanding the dry weather, been incomplete. If one could only be certain, at least to an extent sufficient to be sure of the general run of weather, it would be a comparatively easy matter to suit our bedding arrangements to the weather; but as things go at present, any attempt at doing so is simply haphazard. When the study of the weather attains to the dignity of one of the correct sciences, what a great load off gardeners' shoulders it will be merely to consult the report of the current season's weather and arrange accordingly. As it is, there is no date which can be relied on as trustworthy, and we are obliged to take the weather as it comes, and find the bedding-out either suitable or otherwise as the case may be. Leaving the weather out of account as a factor over which we have neither control nor sufficient knowledge to make up for want of control by other means, we are reduced to doing what we can with the subjects already in cultivation as bedding-plants, or those which may be added from time to time as their suitability is noted. The fault in the various phases through which the "bedding-out" system has come, has been the exclusion of all other modes of arrangement, or kind of plants used at particular times, if not in the fashion at that particular period. That fault is as prevalent at the present day as ever it was when lines of red, white, and blue were set off against clumps of the same and other distinct colours, varied, without being improved, by cutting up the beds and borders in kaleidoscopic fashion. Carpet-bedding when "gone into" has been rendered somewhat nauseating to many; and the "rage" for hardy plants, if too exclusively adopted, will merely mark another era in the history of modern bedding-out. To give hardy plants, as bedding plants, a fair trial, it would be necessary to alter the conformation of most gardens. As a rule, they are not suitable for massing in geometrically formed designs, nor do many of them possess continuous blooming capacity to allow their taking a position of prominence in any such arrangements. At the same time, there are many gardens with the beds so disposed that these can be made use of both usefully and effectively. Some

of the dwarf *Campanulas* in shades of blue and white, *Salvia patens*, *Senecio squarrosa*, yellow, the common double *Feverfew*, *Pyrethrum parthenium*, *Vittadinia triloba*, the common yellow *Saxifrage*, *Antirrhinums*, dwarf *Mimulus*, and *Nepeta cærulea* are a few sorts which mostly require the seeds removed in order to have a continuous display of flowers. Many other hardy flowers can be planted for display at certain seasons, as in spring, or late in autumn, when we have the most gorgeous and stately flowers of the year to select from. There is also a very neglected class of plants which are intrinsically of the highest worth to the flower-gardener, provided he selects with caution. These are hardy annuals. I think the two finest flower-beds I have seen this past season were at Whittinghame, where Mr Garrett had a bed of *Godetia Lady Albemarle*, and another of *Saponaria calabrica*, both in perfect order. A very pretty arrangement I saw at a ducal establishment last year, was formed of a ground-work of *Oxalis tropæoloides*, dotted here and there with some large growing plants. *Lupinus nanus*, *Viscaria cardinalis*, *Nemophila insignis*, *Phlox Drummondii*, *Helichrysums*, *Collinsia bicolor*, hardy *Nasturtiums*, are a few I can think of as being excellent when well managed. There are very many gardens where these can be used with good effect, while, at the same time, there are other beds where *Geraniums*, *Verbenas*, and plants of that class, can be utilised in a manner that no other kind of plants can approach in effectiveness. There are also beds which can be filled with that class of plants to which the general name of carpet-bedding plants has been given. To cut up a series of large beds into geometrical figures, and fill them with these dwarf leaf-plants, is failing to abstract the greatest amount of beauty compatible from such when compared with the glowing masses which can be secured in most seasons from the same beds when filled with flowering subjects. The same want of forethought is apparent when small beds or narrow borders are planted with large-growing flowering subjects, and the great multitude of dwarf leaf-plants totally neglected. There is room for most styles of planting in the majority of gardens, and he who studies the capabilities of the flower-beds and borders under his charge, and makes use of that kind of plant best suited to his own particular wants, will have and give most satisfaction in his arrangements. There is a consideration to be borne in mind, however, which alters somewhat the bias one may have in what is the best thing to do, and that is the expressed wish of one's employer for certain kinds of plants in certain beds or positions. It is of no use to work against these conditions. The only mode of getting over the difficulty, should it prove a difficulty, is to pay extra attention to have that particular wish gratified to the fullest extent, and work the surroundings into conformity with it. At the same time, there is no harm in expressing one's own view, should it be very different from that of the owner. Generally it is possible to get these more into the state which one

would consider best fitted to make the best of the whole, by a little pleasant statement of the difference in the two cases. Then it should be borne in mind that the arrangement proposed in opposition to one's own may prove, when carefully carried out, to be a superior one to that which we would like to substitute for it. Bearing these thoughts in mind, and working from notes made during past seasons, no time should now be lost in making arrangements for the incoming year.

R. P. B.



THE GARDENER'S PRIMER.

NO. VII.

MANY opportunities will occur to the young gardener (his life will be made up of opportunities) of studying the characteristics of Fruit-trees, especially Apple and Pear trees, in different stages of growth, such as their general habit, foliage and blossom, and their so-called fruits, no two of which are alike in size, shape, colour, perfume, taste, time of ripening, and length of time during which they will keep after they have been gathered. When permission can be obtained, he should examine specimens of Apples and Pears, and learn to make outline-drawings of them, which is easily done by cutting through the centre of the Apple or Pear with a sharp knife, and then placing the section of the fruit on blotting-paper to absorb the moisture produced by the juice,—then place it flat on a piece of white paper, and mark out with pencil the outline of it, carefully showing the situation and length of the stalk, and the formation of the calyx, or eye as it is called, and jotting down its correct name.

It will be necessary for him to know the characteristics of a first-rate fruit of its kind or class,—to learn to discriminate between a first-class aromatic Pippin and the gaudy-faced Apple, not worth eating, or the high-class melting Pear and its humbler brother some gritty baking Pear, or the high-class Muscat of Alexandria Grape and its humbler relative the Lady Downes seedling; and having learnt so much, to preserve that knowledge by not impairing his faculty of taste by the unwise use of tobacco, or of strong, coarse, unwholesome, evilly-disposed liquors.

He will do well to know that the periods of time during which fruit-trees raised from seed require to mature their growth, so as to be capable of producing fruit, vary considerably. For the Apple-tree, from five to twelve or thirteen years; for the Pear-tree, from twelve to eighteen years; for the Plum and Cherry trees, four or five years; for the Vine, three to four years; for the Raspberry, about two years are required; for the Strawberry, if sown early, a short time is sufficient—namely, the succeeding year.

The Apple-tree is liable to the attacks of a disease called canker

and the fungus called mildew — some varieties more than others; and also of the following insects, which the gardener should learn to identify—American blight (*Aphis lanigera*), Apple-weevil (*Anthonomus pomorum*), purple Apple-weevil (*Rhynchites Bacchus*), Apple saw-fly (*Tenthredo testudinea*), codling moth (*Carpocapsa pomonella*), stem-boring weevil (*Rhynchites alliaria*), Apple-tree mussel-scale (*Aspidiotis conchiformis*), caterpillar figure-of-8 moth (*Episema cæruleocephala*), caterpillar of wood leopard-moth (*Zenzera æsculi*), caterpillar winter moth (*Hibernia brumata*), caterpillar of goat moth (*Cossus ligniperda*), caterpillar of ermine Apple-moth (*Yponomenta malivorella*). The Apricot is subject to diseases called canker, death in the branches, and to attacks of mildew, and of some of the following insects—*Curculio tenebricosus* (small destructive beetle), *Tortrix Wæberiana* (the larva of green colour with red head, leaves in his track reddish-brown heaps on branches), and *Ditula angustiorana* (greenish caterpillar.) The Plum-tree is subject to canker and exudation of gum, and to attacks from *Tortrix Wæberiana* and *Tenthredo morio* (saw-fly.) The Pear-tree is subject to canker and to attacks from the following insects: *Aspidiotis ostreæformis* (scale), *Aphis pyri mali*, *Curculio pyri*, *Luperus rufipes* (red-footed beetle), slugworm (the caterpillar of *Selandria atra*), and *Astyages hemerobiella*. The Peach and Nectarine trees are subject to canker, gum, and mildew, and to attacks from the following insects: greenfly, red-spider, the caterpillar of *Episema cæruleocephala*, destroying the leaves, *Tortrix Wæberiana*, *Tenthredo populi* (poplar saw-fly), and earwigs. The Cherry-tree is liable to gum and the following insects: red-spider, *Aphis cerasi* (Cherry-tree louse), *Tenthredo cerasi*, and *Cossus ligniperda*.

In the kitchen-garden will be found the herbs generally grown by themselves, and the names of which the gardener will have very early to learn in order correctly to serve, as it is called, "the kitchen" with such of them as are from time to time daily required, and this duty is generally one which devolves on the young gardener very early after entering on his apprenticeship. A list of them and their allies may be useful to him, and is here supplied: *Angelica* (*Angelica archangelica*), Balm (*Melissa officinalis*), Basil, sweet (*Ocimum basilicum*), Basil, bush (*Ocimum minimum*), Borage (*Borago officinalis*), Burnet (*Poterium sanguisorba*), Chamomile (*Anthemis chamomilla*), Chervil (*Chærophyllum sativum*), Chives (*Allium schænoprasum*), Fennel (*Foeniculum vulgare*), Garlic (*Allium sativum*), Hyssop (*Hyssopus officinalis*), Horehound (*Marrubium vulgare*), Horse-radish (*Cochlearia armoraica*), Lavender (*Lavandula vera*), Marigold, pot (*Calendula officinalis*), Marjoram, pot (*Origanum onites*), Marjoram, sweet (*Origanum marjorana*), Mint (*Mentha viridis*), Peppermint (*Mentha piperita*), Parsley (*Petroselinum sativum*), Pennyroyal (*Mentha pulegium*), Rosemary (*Rosmarinus officinalis*), Rue (*Ruta grave-*

olens), Sage (*Salvia officinalis*), Sage, purple (*Salvia officinalis purpurea*), Savory, winter (*Satureia montana*), Seakale (*Crambe maritima*), Savory, summer (*Satureia hortensis*), Spearmint (*Mentha viridis*), Shallots (*Allium ascalonicum*), Southernwood (*Artemisia arborea*), Tarragon (*Artemisia dracunculus*), Thyme, common (*Thymus vulgaris*), Thyme, lemon-scented (*Thymus serpyllum citriodorus*), Tree-Onion (*Allium proliferum*), Wormwood (*Artemisia vulgaris* or *absinthium*).

As the kitchen-garden from time to time is prepared for the production of the different kinds of vegetables, by properly trenching, manuring, and keeping the same free from weeds, he will have diligently to observe and learn how to do the same, profitably, with regularity, and with due regard to space of ground and the wants to be supplied from it. He will find trenching the ground a very simple operation (the writer has often found it so simple that there is no way of getting over it except by steadily keeping at it till it is done), but very difficult to explain in writing. At the commencement of the piece of ground to be trenched, it is necessary to take out the first trench, of the breadth of the piece of ground and of the width of the spade, dig out the soil either one spit deep, called single trenching, or two spits deep, called double trenching, bringing up the subsoil, place it in a wheelbarrow, and take it to the termination of the piece of ground to be trenched, where it is to be left ready to fill into the last trench, which would otherwise be a hole; the ground is then dug, trench after trench, throwing the spits of soil into the trench which will be in front of the digger, until the whole is trenched, and the last trench is then filled up with the soil taken out of the first trench. There is another kind of trenching often practised, called bastard-trenching, which is digging one spit deep and taking out the loose crumbs (as the loose mould at the bottom of the trench is called), and then filling the bottom of the trenching with manure, covering it with soil from the next trench, which in like manner is filled at the bottom with manure, and so on every trench until the work is done—the taking out the first trench and carrying it away to the end of the ground is the same as in other kinds of trenching.

How to supply to the soil, by the application of what is called manure, that which cropping has carried away or diminished, or which the soil does not contain, and without which plants would not have their proper food or nourishment, can only be properly understood by a thorough knowledge of the different kinds of soils, and of their deficiencies. Manure operates in two ways—either as direct food to the plant, or indirectly, by altering and modifying the ingredients of the soil. The best of all manure is farm-yard manure, since the salts and mineral ingredients present in the food of animals have passed off in the excreta. Chalk and lime will change the constitution of some ingredients already in the soil by decomposing, *inter alia*, salts of iron, rendering its oxide soluble. Common salt will decompose organic

matter and give rise to the formation of carbon dioxide (carbonic acid) nitric acid, and ammonia, but its use too largely often caps (as it is expressively called) the ground, probably induced by killing that most useful of God's creatures, the earthworm, and so terminating its labours for the good of mankind.

The gardener will do well to avoid the use of the word *stimulant* as inapplicable to what are called highly concentrated manures. No such stimulant exists, nor does the structure of a plant apparently warrant the application of the word. Such highly concentrated manures are simply nourishment placed within the reach of the roots of the plant at the time it was ready and willing to assimilate it.

He should learn to identify some of the commoner forms of fungus, which he will often hear called cluster-cups, brand, mildew, smut, mould, or blight, &c., such as roestelia on the Pear leaf (*Rœstelia cancellata*), Berberry cluster cups (*Æcidium berberidis*), Rose brand (*Aregma mucronatum*, *Lycthea rosæ*), Corn mildew (*Puccinia graminis*), Hollyhock mildew (*Puccinia malveacearum*—common on *Althæa officinalis* and *Malva sylvestris*), Rose rust (*Phragmidium mucronatum*), white rust on cruciferous plants (*Cystopus candidus*), Potato mould (*Peronospora infestans*), Pea mould (*Peronospora vicie*), Rose blight (*Sphærotheca pannosa*), Hop blight (*Sphærotheca castagnei*), Pea blight (*Erysiphe Martii*) Salsafy and Scorzonera blight (*Erysiphe lamprocarpa*), *Oidium fructigeum*, concentric rings on Apples, Pears, Plums, &c.

Fungi are organisms endowed with life, with different modes of reproduction—one being by spores or seeds, of which the atmosphere appears to be always full, and to be the vehicle made use of for their dispersion. Those belonging to the epiphytal class seem as numerous as the phænogamous plants, on which they are most frequently found, almost to indicate that each living phænogamous plant has its appointed guest in the shape of some fungus, without much restriction as to soil, situation, or climate. As living organisms they fulfil some beneficent object, and are apparently as much the object of the Creator's skill as other works of His. Some of them appear on plants in a low state of vitality in the autumn, assisting in the general changes then going on, helping forward the work of decomposition, and preparing the soil for new growths. Others induce chemical changes—others find a dwelling-place in the tissues of living leaves, *apparently* healthy leaves, but generally in the leaves of diseased, unhealthy, ill-grown, over-fed plants rendered unhealthy by over-draughts of liquid-manure supplied to them by him whose duty it was to have withheld it. Their object seems to be by decomposing the tissues of plant-structure to cause them to make way for other and more healthy organisms.

The gardener has not much to fear from their visits, many of them are only barren states of other well-known fungi, which, as soon as they appear, can be easily got rid of. The appearance of others is the result of want of vigilance in purchasing, plants already infected, or

seeds saved from plants (Hollyhocks or Tomatoes, for instance), which in their lifetime had been the hosts and entertainers of fungi, and which will produce plants infected like their parents, or in growing plants in a damp, unhealthy, draughty house, or in improperly opening the front lights of the vinery during forcing-time, and so letting in the spores of the mildew, most likely some state of *Erysiphe communis*, formerly thought to be an *Oidium*, and then called *Oidium Tuckeri*, or in planting Potatoes already infected with *Peronospora infestans*, or in using farm-yard manure, in which Potato-bines (which had entertained in their lifetime such guests as *Peronospora infestans*) have been placed to rot, instead of burning them, or in growing Roses in a draughty situation, or Peas in a dry shallow soil. Again, if chips of wood find their way into the soil of the Vine-border, the spores of some common fungus in the soil, not one of epiphytal kind, will soon find out the chips of wood, and in the most systematic and beneficent way will forthwith split up their tissues, and return their carbon to the common stock; but in so doing the fungus growth will not be very particular to confine its growth to the chips, or to limit its duration of life to the exact period of time required for their decomposition, but will foliage about the border for other chips of wood on which to complete its career, and in so doing will materially damage the Vine-roots.

It is no part of our object to explain the use of the spade, the scythe, the besom or broom in sweeping a lawn—it will be sufficient to state that unless learnt correctly, and that early in life, it will never be acquired in later years.

LABORE VINCES.



THE HALE FARM NURSERIES, TOTTENHAM.

HAVING a deep interest in herbaceous and Alpine plants, we embraced the opportunity afforded by a short midsummer visit to London of gratifying a long-cherished desire to spend a few hours in Mr Thomas S. Ware's extensive and now celebrated establishment. It will, of course, be easily imagined that it would take as many days as we had hours at our disposal to do anything like justice to a collection which requires nearly 30 acres for its accommodation. Thanks, however, to the courtesy of Mr Perry, the intelligent manager, and to Mr Gifford, one of his able assistants, we were enabled to make the very best use of our limited time, and to take a few notes which, we trust, will prove interesting to our fellow-readers of 'The Gardener.'

We were first conducted over the florist-flower department, where enormous quantities of the leading varieties of plants usually classed under this head are grown; and some idea may be formed of the importance of this branch of the business when we say that they occupy about 6 acres of ground, and that to meet the demand it is necessary to propagate annually something like 30,000 Carnations and Picotees

40,000 Pinks, 4000 Phloxes, 2000 Pyrethrums, 3000 Auriculas, and many thousands of Dahlias, Pentstemons, Delphiniums, Antirrhinums, &c., &c. What are known as Herbaceous and Alpine plants, however, form the chief feature of the nursery, and these cover an area of nearly 20 acres. Fully an acre of this section is devoted to the cultivation of Herbaceous Pæonias, a class of plants which, considering their easy culture and highly ornamental character, is far too little known. All the really good and distinct sorts are here grown, not only for the supply of nursery orders, but for their showy, variously-coloured, and in many cases sweetly-scented flowers, which, in most seasons, are produced in great profusion, and command a ready sale at good prices. Among the other genera are to be found not only all the old favourites worthy of cultivation, but most of those of recent introduction, the more popular being grown in large numbers. These are cultivated in beds, borders, rockeries, and pits, according to their several requirements; while many thousands of the leading sorts are kept in pots, so that they may be sent to customers with perfect safety, even in the growing and flowering seasons. Among the more interesting and showy of these we observed great numbers of *Meconopsis nepalense*, the rare and beautiful Himalayan Poppy, with pale sulphur flowers and large deeply-lobed leaves; *Veronica longifolia*, var. *sub-sessilis*, a deciduous species recently introduced from Japan, with rich blue flowers borne on spikes nearly 1 foot high and from 4 to 5 inches round; *Geum coccineum plenum*, though by no means new, not yet very common, and one of the best of hardy border-plants, its double scarlet blooms lasting a long time, and being available for the choicest bouquets; *Lychnis vespertina plena*, white and red flowered sorts, showy, and much valued in summer and autumn; *Sparaxis pulcherrimum*, with flowers varying from light rose to crimson and every shade of purple, and its variety *atro-purpurea*, purplish crimson, both graceful, free-flowered plants; *Senecio pulcher*, a new and strikingly effective species, producing its large purplish-crimson flowers, with a bright golden disc in autumn; a great variety of Asters, or Michaelmas Daisies, including *Townsendii*, *Sericeus*, *pyrenaica*, and *bessarabicus*; Primulas, too, such as *rosea*, *cashmeriana*, *denticulata*, and *cortusoides amoena*. The latter, in some twenty varieties, are grown by the thousand, while all the choicer Alpine species are largely represented. Hosts of other plants, which we cannot here enumerate, were seen in more or less abundance all over the grounds.

The collection is rich in hardy Orchids, nearly one hundred distinct species and varieties being cultivated in the beds specially set apart for them. Such things as *Cypripedium spectabilis*, *pubescens*, *acaule*, and *macranthum*; various sorts of *Habenarias*, *Betia hyacinthina*, *Disa grandiflora*, *Epipactis*, in several species, with their varieties, most of the *Ophrys*, *Orchis*, and many others, are grown in large numbers. Though too late in the season to see these fine plants in flower, the

decayed flower-stalks, still standing, bore ample testimony to the magnificence of the display during the past spring and summer. We also, unfortunately, missed the Trilliums, a genus of beautiful North American plants, with white, purple, red, and greenish-coloured flowers, which appear in April and May. Large clumps of more than a dozen species of these were luxuriating in moist beds of peat soil.

The rockeries—constructed more with the view of supplying the varied wants of the plants than for artistic effect, though that is by no means wanting—contain a wealth, not only of the tiny Alpine gems, but of the stronger-growing shrubs and perennials which prefer such situations. Here are to be seen specimens of the dwarf *Rhododendron chamæcistus*, *Rosa pyrenaica*, *pimpinelifolia*, and *rugosa*, the latter with large glossy pinnate foliage, and clusters of rosy-crimson and white flowers, nearly three inches across, which are produced during most of the summer, and are succeeded by an abundance of scarlet berries as large as crab-apples. Scattered about in endless profusion are to be seen patches and groups of such plants as *Linnæa borealis*, interesting not only for its beauty, but as the plant selected by the great father of Botany to bear his name; *Gentianas alpina verna* and *angustifolia*, with many of their congeners; *Opuntias*—including *Rafinesquiæna*, the hardiest species of this the only known hardy genus of the Cactus family; various species of *Linaria*, including *alpina* and *pilosa*; *Campanulas pulla* and *pumila*, with its white-flowered variety; *Dianthus alpinus*, the prettiest and dwarfiest of its race, with many other species of the same genus; the showy and distinct *Dryas octopetala*, a British Alpine, associated with its Tyrolese variety *lanata*, distinguished by its hoary leaves and larger flowers. The collection of *Helianthemums*, or Rock Roses, of which the species *vulgare*, an inhabitant of our rocky hillsides, is the type, is very complete. *Sedums*, *Saxifrages*, *Sempervivums*, of every sort in cultivation, with a multitude of other no less interesting things, which the limited time at our disposal precluded us from noting. In and around the rockeries are a number of little dells, in which are planted out collections of the rarer Ferns, *Sarracénias*, sorts, *Darlingtonia californica*, *Dionæas*, *Parnassias*—of which we noticed a group of four distinct sorts—*Droseras*, *Pin-guiculas*, *Swertias*, &c., &c., all in vigorous health.

The bulb department, which contains nearly, if not all, the hardy genera and species in cultivation, will form the subject of a brief future notice.

HUGH FRASER.

THE AMATEUR'S GARDEN.

ARTICHOKES : JERUSALEM AND GLOBE.

THESE are seldom or never seen in amateur's gardens, but why we do not know, except it be that very few amateurs know anything about them—and yet they are vegetables of easy cultivation, especially

Jerusalem Artichokes. They somewhat resemble Potatoes in shape, and in the way they are produced, clustering round the bottom of the stems. They will grow in almost any soil, but are, of course, finer in deep, rich, well-cultivated soil. Whole tubers (small ones) are planted in March, or earlier, in rows 3 feet apart and $1\frac{1}{2}$ foot or so in the row, and about 4 inches deep. All the cultivation they need further simply consists in keeping the ground clear of weeds and well hoed. They are ready for use by autumn, and may be taken up and stored in cellars like Carrots or Parsnips, or in pits like Potatoes; but they are very often left all winter where they have been grown, as it is considered they deteriorate by storing. They will form a very pleasing substitute for, and add variety to, ordinary roots that are used as vegetables during the winter months.

Globe Artichokes require different treatment, and it is not the root which is used in this case, but the somewhat thistle-like top. Light soil gives the least trouble in the cultivation of this vegetable: on heavy wet soils it is sometimes difficult to winter. It thrives splendidly on deep, rich, peaty soils; and in any case it is necessary, in preparing the soil for *Globe Artichokes*, to select a well-drained spot, to trench deeply and manure liberally, in order to secure first-class results. This should be done in autumn or winter, and in March the surface should be well broken with the fork, and a dressing of thoroughly decomposed manure mixed with the surface soil unless it is naturally rich. It is a good plan to plant as the digging proceeds; and young plants should be planted in rows 3 feet apart and 3 feet in the rows, putting in the plants of the second row alternate with the first, and so on. They are often enough planted in rows 4 feet apart and 4 feet in the rows, in patches of threes, triangle fashion. Either plan will do. The young plants are got growing round the stools of old plantations, and they should be carefully lifted with a fork, so as to secure roots to each plant, as they grow very much better when good roots are attached than when pulled out carelessly and the roots left behind. Should the spring be a dry one, a good watering will be of service; and if a dry summer ensues, a mulching of rich manure and copious supplies of weak sewage or cow-house drainings, well diluted with water, will prove of immense service. March or April is the best time to plant them. Of course they require to be kept free of weeds. Spring-planted ones throw up their heads later than established plantations, and so form a succession. For this reason it is desirable that a few, according to the wants of the household, be planted every spring, and a corresponding portion destroyed, especially as they cease to throw up so good heads after a year or two as young plantations do, more especially when they are neglected. As winter approaches—say about the beginning of November, or sooner, should severe weather set in early—the plants will require to get a little protection by placing dry litter firmly round their collars, but leaving all healthy leaves sticking out at

the top, so as not to rot out the centres of the plants. This should be removed in spring, and a dressing of manure given and forked into the surface in March or April, according to the forwardness of the season. Where mulching is not necessary, crops of early Turnips, Lettuce, and other salads which reach perfection rapidly, may be sown between the rows of new plantations for the purpose of economising the ground.

A GARDENER.



HARDY FRUITS—DECEMBER.

FRUIT-TREES ought now to be all planted, mulched over their roots, and safe for the winter, and stakes placed to keep them secure from wind. Former hints as to draining, trenching, and surface-dressing must not be neglected where a fair return from the trees is expected. Nothing is more tormenting in a garden than fruit-trees, which have arrived at maturity, suddenly showing signs of canker and decay. This can, in the majority of cases, be prevented by keeping the roots clear of poisonous wet soil, and encouraging them to root upwards to sun and air. Old trees may be greatly improved by clearing off the unhealthy surfaces down to the roots, placing healthy loam and rotten manure, well mixed, over the surface. The stems of the trees should be kept clear of moss and other destructive parasites. Suckers should have no existence. Scale and American bug should have prompt measures. Thoroughly wash with soft-soap water at 120°, and paint with Gishurst Compound, soot, and cow-manure made into paste. All the soil should be removed from under such trees, and fresh loam from a distance, where no fruit-trees are growing, used. Dustings of soot, lime, and sulphur may be applied several times during the winter. Where caterpillars and other vermin have been troublesome among Gooseberries and Currants, the same measures (to prevent their depredations next season) ought to be adopted as with other fruit-trees. A painting of soot, lime, and cow-manure may be applied to branches of fruit bushes, to prevent birds from devouring the fruit-buds: this is, of course, applied after pruning has been performed. The pruning of all trees except Peaches and Nectarines may be done when there is no frost. Cutting the wood during frost may produce canker and other evils. Apples to be kept, such as Dwarf Standards (either bushes or pyramids), may be freely thinned out, leaving the leading branches clothed with spurs, regulating the distance between each—the more equidistant the better. Orchard-trees ought not to become tangled thickets, which bear only on the outside points. It is better to thin out the larger branches, keeping the centres open. Large branches should not be cut, unless such an operation cannot be dispensed with. The same applies to Pears and Plums. Cherries do best when spurred, but they are apt to canker when root-action is bad, or when gross

growth is made during the summer, and not ripened in autumn. Trench and manure soil which is to be planted with Strawberries in spring. Mulch Raspberries heavily ; they like rich cool soil. Prune them, leaving four or five of the best canes, which can be tied to wires or stakes fixed lightly every four to six feet apart. Bending them over and forming arches is a good system where stakes are difficult to procure ; they are then easily netted. If frosty weather should set in, the pruning and tying of trees may be left till weather is more suitable. See that no ties cut the bark : leave plenty of space to swell.

M. T.



ON HELLEBORES.

CONSIDERABLE interest—more, perhaps, than their intrinsic beauty warrants—attaches to Christmas Roses. This is, no doubt, owing largely to the fact that some of them, especially the Christmas Rose proper, blooms at a time when little else in the shape of flowers is to be met with out of doors to rival or compete with it in an estimate of its decorative qualities. They are all, however, very interesting plants, with very distinctive and characteristic features. The structure of the flowers is a study in itself—a consideration of which reveals the fact that the petals are the least conspicuous parts, and contribute little or nothing to the effective qualities of the plant in an ornamental sense. There are eight or ten small tubular bodies arranged on the inner base of the five large, green, white, or coloured sepals, which appear to be the real petals, but are not. In the true Christmas Rose, which has the largest flowers of any species known in gardens, this peculiarity is very marked ; but in all the other species, the same tubular structure of the petals obtains as an unfailing characteristic, and is accompanied also by a nectariferous gland at the base of the tube.

The true Christmas Rose is the most ornamental of the genus, in so far as the object depends on the flowers solely ; and in the present time, when fashion demands such large and continuous supplies of cut flowers, and of flowering plants in pots during the winter months, this humble but beautiful plant is a valuable auxiliary, more especially where forcing facilities are limited. The plant may be lifted from the open ground for indoor decoration any time before the flowers expand, and placed under cover of a hand-glass or cold frame to protect the blooms from the damaging effects of the weather. When treated in this way, or when grown in pots purposely, and protected from wet and frost and snow, flowers of great purity and large size are obtained ; and the large pure white petals, or rather sepals, being persistent, are particularly valuable as cut flowers. There are several varieties of the true Christmas Rose, the best of which is the one known as *Helleborus*

niger maximus. It is earlier, and the flowers and foliage are larger than they are in any of the other forms. I met with another form in Edinburgh last winter, which is quite distinct from any other in its habit and in its time of flowering—being just coming to its best when the other growing close beside it was far advanced in the process of becoming green and seedy. This is an acquisition, because it extends the period in which this popular flower may be enjoyed.

One of the valuable ornamental qualities of *Hellebores* is their being evergreen. Some of them, but especially *H. fœtidus* and *H. argutifolius* may be characterised as remarkably striking and handsome-foliaged plants, which may be made to contribute something towards the decoration of the garden in the winter months. They are very suitable for the margins of shrubberies, and for imparting evergreen furnishing to rockwork where there is sufficient depth of soil to sustain them. Among the more ornamental-flowered species may be mentioned, besides *H. niger* the true Christmas Rose, *H. atro-rubens*, having large dark purple flowers; *H. colchicus*, with considerable panicles of large purple-red flowers; and *H. olympicus*, a creamy or greenish-white species—very floriferous and ornamental.

W. S.



CLERODENDRON FRAGRANS.

THIS lovely plant is not so much grown as it deserves to be for autumn and early winter flowering; its double white sweet-scented flowers are very valuable during the time named, and are useful for a variety of purposes, and much sought after by lovers of fragrant flowers. For room decoration it is invaluable; and nice plants can be grown in 4-inch pots, suitable for small vases, containing from two to four heads of bloom. When well grown, it can be kept within reasonable bounds in the size of pot named. Small specimens can be produced not more than 8 and 9 inches high, which, with its bold foliage, renders it a striking object. Of course larger specimens can be produced if the cultivator thinks it necessary. Their size entirely depends upon the time the plants are propagated, or if old plants are grown on from the commencement of the year. This plant can be bloomed with impunity two or three times in the season; but this with small plants is not advisable, especially when preparing them for winter work. There is too frequently a great mistake made in growing this *Clerodendron* in the stove amongst a collection of plants. In this position it soon becomes tall and naked, and too often the picture of ill-health, as well as a prey to all insects that infest plants.

The plants are propagated any time from April to the beginning of June from cuttings, which strike very freely if accommodated for a short time in the propagating-house or under the shade of Melons, &c.

After being rooted it should gradually be moved to cooler quarters. We have not yet tried it in cool pits during the summer, but in favourable years we believe it would do for a short time during the hottest part of the season. Stopping must be attended to, according to the time the cuttings are rooted and the progress the plants make afterwards: the earliest-rooted plants can be stopped two or three times; others, if only stopped once, generally throw two or more shoots, which produce as many heads of bloom. The last-rooted ones, if not pinched at all, are by no means to be despised if they only carry one head of flower and fine foliage down to the pot. This plant is in no way particular as to soil, but when in small pots should have a rich compost consisting of good loam and a seventh of manure, and sufficient coarse sand to keep the soil open. It is advisable to feed the plants liberally with liquid manure after the blooms commence to show: an occasional application of soot-water imparts to the foliage a fine dark blue, and assists the plants materially.

The old but useful *Clerodendron fallax* can be treated in a similar way, or raised from seed, and will produce a fine show of scarlet at this season of the year.

W. B.



LESSONS FROM THE LONDON PARKS.

THESE parks have so often been described as to render it unnecessary for me to attempt a description of them. Instead of this I propose to enumerate some of what I considered the most "taking" arrangements, effective plants used, &c., in the hope that my remarks may prove of service to some of your readers who have not had an opportunity of visiting these parks this season.

Although my remarks will be confined principally to "good bits," it must not be imagined that there were no failures, for failures there were here as elsewhere, and they are perhaps equally as instructive as successes. Of course, where innumerable tastes have to be met, and the fashion, as it were, to be set, experiments must be tried that sometimes end in failure.

I will commence with what I conceive to be a very palpable mistake—viz., the extreme dulness of many of the large subtropical beds. Cannas, *Ricinus*, Giant Hemp, *Polymnia grandis*, Tobacco-plants, Funkias, &c., are very effective associated with other brighter foliage-plants, but when grouped without the latter (I am thinking now more especially of a very large bed in Hyde Park), the surroundings being of the same hue, they are certainly very unattractive. During hot and dry seasons, when their growth is more luxuriant and the turf sun-scorched, their effect may be somewhat better; but even then a few of such plants as *Solanum marginatum*, *Arundo donax variegata*, variegated Maize, *Abutilon Thompsonii*, and an improvement on the latter useful variety, *Abutilon Darwinii tessellatum*, *Phormium tenax variegatum*, &c., mixed in, would brighten them up. A useful plant seldom seen in the parks—viz., the variegated Coltsfoot (*Tussilago farfara variegata*)—ought to be more used for the margins of large subtropical beds, &c. Funkias are largely used for this purpose, but are much too green. Gardeners, where they have the power to do so, would do well to imitate the arrangements

of the beds themselves in the parks. They are not arranged in one or two large and fanciful designs, but are distributed throughout the grounds in some instances, and in others near the principal walks and roadways. The beds, too, are large and plain, and as a consequence are much more easily and effectively planted. By this mode of arranging the beds a much greater variety of plants can be used, every variety of style imitated, or a new one attempted without endangering the general appearance; and added to this, the interest is sustained throughout, and not a flash and all over, as is the case where the beds are concentrated. Carpet-bedding, in spite of the prognostics of adverse critics, is still in the ascendant, and is, with the frequenters of the parks, the most popular form of planting. A few well-done carpet-beds in private places are equally as certain to be the most admired, and for this reason should be attempted, however objectionable the style of planting may be to the operator. Many of the plants used are quite hardy, oftentimes to be found in the old herbaceous borders, &c. *Alternantheras*, largely used in the carpet-beds, have grown but little this season; but they still answered their purpose, as they were planted thickly and kept their colour well. Green-foliaged plants are not so much used as they were, and opinions vary as to the best variety. *Herniaria saxatile* is preferred by Mr Graham at Hampton Court (a good authority), but the *Mentha pulegium gibraltarium* is the most generally used, and is, I think, the most pleasing green; but the former is the less troublesome after being planted. Succulents are largely used in various ways, and are very effective, especially as single specimens worked into the circles, &c., of the designs. At Battersea Park, *Sempervivum tabulæforme* was used for clothing the sides of some sunken beds. These beds, although well planted, and, I believe, original, were not so attractive as were many of the beds planted in other styles in the same park. The surfaces of some were perfectly flat, and are, I suppose, most strictly speaking, carpet-beds; but I am inclined to give the preference to those designs which included specimen plants of *Aloe filifera nana*, *Dasyliion acrotrichum*, *Agave americana*, *Bonapartea gracilis semilifolia*, *Chamæpeuce diacantha*, *Chamæpeuce Cassabonæ*, a great variety of succulents, &c. The season was much against the subtropical plants at Battersea, the hailstorm of 2d August being very damaging. *Cannas*, *Ricinus*, &c., were much smaller than usual, the few notable exceptions being the *Polymnia grandis*, *Solanum macrophyllum*, *Aralia papyrifera*, and *Grevillea robusta*. A number of the latter dotted among well-coloured plants of the variegated Vine (*Vetis heterophylla variegata*) were very effective. *Grevillea robusta* is easily raised from seed, and, if plunged in pots where required, comes in admirably afterwards for winter decoration of conservatories, &c. A few plants of *Nilanthus grandulosus* disposed at intervals among *Cannas*, &c., showed with good effect; and some of the hardy *Aralias* are well adapted for the subtropical garden. One of the most effective beds was filled in the centre with a dark-leaved *Canna*, surrounded with *Abutilon Darwinii tessellatum*, alternating with *Amaranthus melancholicus ruber*, and edged with *Dactylis glomerata* mixed with a blue *Lobelia*. Large numbers of Palms and other foliaged plants were, as usual, grouped and plunged about Battersea Park—the most conspicuous being *Pritchardia pacifica*, *Cycas revoluta*, *Areca sapida*, *Dicksonia antarctica*, *Pothos acaulis*, *Seaforthia elegans*, *Pandanus utilis*, *Latania borbonica*, *Phoenix dactylifera*, &c. Mr Rogers, the able superintendent, also uses a number of flowering plants in mixed beds, &c., which is a step in the right direction, as they are much admired and are enlivening. Large flowering *Begonias* were scarcely so good as usual, neither were the *Fuchsias*

looking well. *Tigridia grandiflora* was very showy; some *Kalosantes* also had been very bright. A bank of *Clematis Jackmannii* was very fine, and numbers of the neat-growing and free-blooming *Yucca flaccida* were to be seen in groups.

I cannot understand why Dahlias are not more used in the parks, as they would brighten up many a dull place. The bedding varieties are largely used in the Crystal Palace grounds; and very effective they are, the present season appearing to suit them. At Hyde Park more of the commoner bedding-plants, such as Pelargoniums, Calceolarias, &c., are used. Most of the beds are inside the rails following the road known as Park Lane. Some of the arrangements were very good, but there was a great sameness about them, many being banded and edged with the same varieties. This may be correct planting, but is very uninteresting nevertheless. Mixed centres were the most effective—notably those containing *Calceolaria amplexicaulis* and *Ageratum americanum*, *Viola Golden Gem* and *Iresine Lindenii*, *Pelargonium Ariosta* and *Viola Bluebell*, mixed *Lantanas*, &c. Good Pelargoniums used were Mrs Miles, good pink; Mrs Turner, deep pink; and John Gibson, very fine scarlet,—all excellent bedders. *Lobelia Owen*, a peuce-coloured variety, was particularly good and distinct; and the *Mazarine Gem*, a deep blue, with large white eye, was very conspicuous. The carpet-beds were fewer in number, but were remarkably well done. *Sedum acre elegans*, creamy variegated; *Antennaria tomentosa*, silvery white; *Sedum lividum*, green,—were all effectively used in the carpet-beds, and are quite hardy. A great variety of succulents were used. Some of the subtropical plants in tubs and pots in different parts of the park are grand specimens; more especially the plants of *Latania borbonica*, *Seaforthia elegans*, and *Chamærops excelsa*. *Musa ensete* was very effective wherever used—*i.e.*, either as single specimens or in groups. *Erythrina crista-galli*, as grown and bedded out at Hyde Park, is very fine and attractive. Victoria and Regent's Parks were again very creditably planted; one of the attractions of the former being a long well-arranged herbaceous border. Although Hampton Court is not, strictly speaking, a London park, it is still much frequented by Londoners, especially since it has become famous for its flower-beds, in addition to the oft-described monster Vine. In spite of the adverse season, the beds—the carpet-bed especially—were very bright and attractive. To keep off the crowds from the carpet-beds on some occasions, it was found necessary to put up stakes and cords; and Mr Graham, the very practical superintendent, has also had canvas covers made for them; and by a judicious use of these their beauty is prolonged long after the breaking up of the other beds and distribution of their occupants among the working classes. Mr Graham's 'Guide to the Gardens, &c.' which he annually issues, is extremely useful to visitors generally, and to gardeners and amateurs in particular—as, in addition to the key to the bedding arrangements, it contains several excellent diagrams of carpet-beds and how to plant them; lists of plants suitable for the various modes of summer bedding and how to propagate them, &c. The house room at his command is very limited; to all appearances quite inadequate to "turn out" the 195,000 plants used. As before stated, the carpet-beds were remarkably well done, the designs being very artistic and original, and without diagrams indescribable. A great variety of plants were used, many of them being hardy—notably several varieties of Stonecrops, *Veronica*, *Incana*, *Pyrethrum*, *Mentha*, *Herniaria saxatile*, *Antennaria tomentosa*, *Sempervivum*, &c. Mixed centres were in the ascendant among the other beds, and they cer-

tainly were very effective. Another good feature in these beds was the unusually broad edgings of some, and the "inner edgings" of other beds. Several good arrangements consisted as follows: centre, Mrs Pollock Pelargonium, mixed with *Viola Tory* (a good purple), and broadly edged with *Coleus Verschaffeltii*; centre, a mixture of *Pelargonium Crystal Palace Gem* and *Viola Blue Perfection*, broadly banded with *Iresine Lindenii*, edged with *Euonymus radicans variegatus*; centre, *Pelargonium Bijou* and *Dactylis glomerata*, broadly banded with *Iresine Lindenii*, edged with *Stellaria graminea aurea*; centre, *Pelargonium Lucius*, banded with two rows *Abutilon vexillarium variegata*, edged with *Alyssum saxatile variegata*; centre, a mixture of *Pelargonium Crystal Palace Gem* and *Viola Blue Perfection*, banded by *Iresine Herbstii*, edged with *Symphoricarpos montana variegata*; centre, a mixture of *Pelargonium Bijou* and *Viola Favourite*, broadly edged with *Coleus Verschaffeltii*. The best bronze Zonal *Pelargonium* used was *Black Douglas*, and Dr Denny's *Commander-in-Chief* was pointed out as being the best and most enduring scarlet-flowering variety.

W. IGGULDEN.



CIRCULATION OF WATER IN PIPES.

THE best way of making this subject clear is probably to resort to facts which have been ascertained by experiment. The sole force which operates to produce motion in the water is the force of gravity. This force operates most strongly on bodies which are called the heaviest, and by so operating it may even cause lighter bodies to rise. Thus the light weight in the scale of a balance rises, because the heavier weight in the other scale is more strongly acted upon by the force of gravity. A cork rises from the bottom to the top of water because a corresponding bulk of water is heavier—that is, is more strongly acted upon by the force of gravity than the cork. Both cork and water are pulled downwards, but the water (that fills the same bulk) is pulled more strongly, and therefore the pull upon the water overcomes the pull upon the cork—the water sinks, and the cork rises. In precisely the same way if a portion of water is more dense—that is, heavier than another portion—it will be pulled down, and the lighter portions will be forced up by the heavier taking its place. Now, as heat causes water to expand, or to become less dense, a given bulk of cold water is heavier than the same bulk of warm water; the cold water is therefore pulled down, and forces the hot to rise. It is important to understand this, because people are apt to speak incorrectly of heat causing water to rise. It does nothing of the sort. From 32° to 39°.2 the action of heat causes water to contract, or to become heavier, and, therefore, if a portion of water is warmed to any degree below 39°.2, it will sink instead of rising in the midst of water—that is, if a lower temperature. Above 39°.2, however, heat causes water to expand or become lighter, and then it will rise, because the colder and heavier water falls lowest and forces it up.

The amount of expansion in water corresponds inversely with the weight of equal bulk or the specific gravity, and it has been very carefully measured by men of science. The following table gives the mean results obtained by the latest observations. I have thought it sufficient to set down the figures for increments of 18° , which corresponds to 10° C.* :—

Temp. Fahr.	Vol. of water (at $32^{\circ}=1$.)	Sp. gr. of water (at $32^{\circ}=1$.)	Temp. Fahr.	Vol. of water (at $32^{\circ}=1$.)	Sp. gr. of water (at $32^{\circ}=1$.)
32°	1.000000	1.000000	122°	1.01181	.98833
$(39^{\circ}.2)$	.999871	1.000129	140°	1.01677	.98351
60°	1.000124	.999876	158°	1.02243	.97807
68°	1.001615	.998388	176°	1.02874	.97206
86°	1.004123	.995894	194°	1.03554	.96568
104°	1.00757	.99248	212°	1.04300	.95878

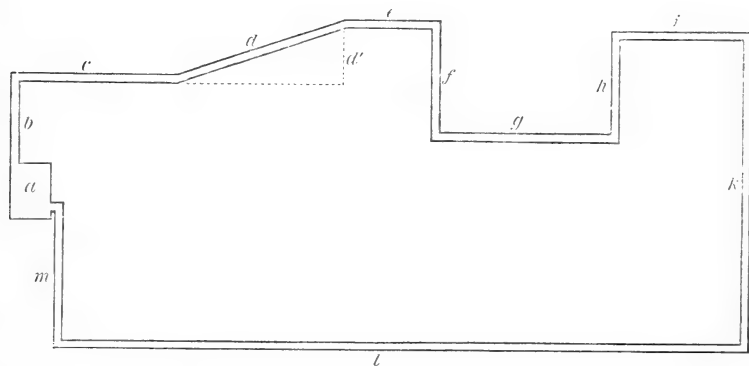
It will be seen from this table that water does not expand in equal proportion for different increments of heat. Thus from 50° to 68° it expands about 15 parts in 10,000, from 122° to 140° it expands about 50 parts in 10,000, and from 176° to 194° it expands about 78 parts in 10,000. This fact will be found to have some importance in considering questions of circulation in pipes.

In dealing with the effect of gravity on water, it must be kept in mind that we have to consider only the height and not the bulk in other directions. This is a law of hydrostatics, a familiar example of which is that water will stand at exactly the same height in a small pipe communicating with a big barrel as it does in the barrel itself when it is of the same temperature in both. But, 1st, if the pipe communicates with the barrel only at its bottom, and we heat the water in one but not in the other, the level of the hot water will stand a little higher than that of the cold, because it takes a greater height of the hot water to balance the denser and heavier cold water. And, 2d, if the pipe communicates with the barrel both at bottom and top, and we heat the water in the barrel or the pipe, but not in both, a circulation will be set up, because now the water in both stands at the same level, but the column of cold water is heavier than the column of hot; the cold is, therefore, carried down by the superior force of gravity, and compels the hot to rise. The amount of force exercised appears from the table given above. Thus if the water be 3 feet deep, and its temperature in the pipe be 50° , and in the barrel 194° , then the weight of the water in the pipe is $3 \times .999876 = 2.999628$ (in grains, ounces, or any other denomination), while the weight of a corresponding column in the barrel is, in the same denomination, $3 \times .96568 = 2.89704$. Hence if the water in the pipe weighs 2.9 oz., the corresponding amount of water in the barrel weighs about 2.8 oz., and

* Fuller tables may be found in any of the treatises on heat.

necessarily the 2.9 oz. goes down and the 2.8 oz. goes up. When the water has been so far transfused as to have become of the same temperature throughout, the motion necessarily ceases, because it is all of equal weight.

Therefore the way to ascertain whether water will circulate in a given arrangement of boilers and pipes, is to take the weight of all which we wish to ascend, and the weight of all which we wish to descend, and to ascertain if the weight of the latter exceeds that of the former. If it does, the circulation will be as we wish; if the opposite is the case, the circulation will be reversed; and if the weights are equal, there will be no circulation at all. We get the relative weights by multiplying the specific gravity of each portion by the perpendicular weight of that portion, and we get the specific gravity from the temperature. It is not quite exact to take the mean temperature of each portion, but the errors nearly balance themselves, and may be disregarded. We need pay no attention to the portions which are on a level; and in portions which are sloping we take only the perpendicular height. Thus, if we suppose the subjoined figure to



represent the section of a system of pipes, *a* being the boiler, *b* the “flow,” and *m* the “return,” then we intend the water to ascend in the portions *a*, *b*, *d*, *h*, and *m*, and to descend in *f* and *k*. Now if we suppose the height of each of these portions to be that set against it in the following table (the height of the slope *d* being reckoned only as the perpendicular dotted line *d'*), and if we calculate from the length of the level portions that the water will gradually cool down to the mean temperature set against each, then by multiplying the mean temperature by its corresponding height, we get the relative weight stated in the fourth column.

Pipes Ascending.	Height.	Temp.	Sp. Gr.	Weight.	Total weight Ascending.
<i>a</i>	} 2	} 194°	.96568	4.82840	17.65812
<i>b</i>					
<i>d</i>					
<i>h</i>					
<i>m</i>	4	86°	.99589	3.98356	
Descending.					Total weight Descending.
<i>f</i>	6	158°	.97807	5.86842	17.77818
<i>k</i>	12	104°	.99248	11.90976	
Excess of weight of descending water, . . .					.12006

Here, then, we see that there is a clear turn of the balance in favour of the descending water, and therefore, under the conditions proposed, there will be a circulation, in spite of the dips at *g* and *l*. But now, if we suppose the boiler raised to the level of *c*, we shall have no *b* pipe at all, but only the height of the boiler 2 feet, while *m* will be 10 feet instead of 4: the result will be that the weight of the ascending water would be 20.73646, which would be more than the weight of the descending water, and consequently there would be no circulation. It would, indeed, commence, but by the time the heated water reached *f*, an equilibrium would be established, and there would be no motive power to force it in either direction. If, again, the boiler were supposed to remain, as shown on the diagram, but without any rise at *d*, then the height of *k* would be only 9 feet, and yet the water would still circulate, if the temperatures were as stated in the last table; but if the range of pipes were shortened so as to make the temperature of the water at *k* 140° instead of 104°, the circulation would cease, for calculation would then show that the water intended to ascend would weigh 14.74194, while that intended to descend would be only 14.72001. In short, if in any arrangement we obtain the temperatures and the heights of the several ascents and descents, we can calculate to a certainty whether the water will circulate or not.

A few words may now, in conclusion, be said on some questions that have been raised in the controversy.

1st. Water is an exceedingly bad *conductor* of heat; but this must be understood of it strictly when not in motion. When at liberty to move, its particles become, by what is called *convection*—i.e., by successive contact—capable of very rapidly transmitting heat.

2d. The rapidity of circulation cannot be reduced to any useful rule, because it is so greatly affected by friction, and still more by alteration of direction, in bends of the pipes.

3d. Water in a pipe that leaves the boiler perpendicularly cannot have any back currents, but if the pipe leaves the boiler horizontally,

there may at first be a back current. It will, however, in most cases quickly disappear, because the opposing currents will cause a certain amount of mixture, and then the much colder water in the return-pipe will force the whole water in the flow-pipe to advance. Any inconvenience from the water in the bottom of the pipe being colder than the top may be obviated by inserting a short piece of sheet-iron, twisted to half a turn of a spiral, which will reverse the top and bottom water as it passes, and so compel it to mingle.

4th. There may, in certain cases, be a distinct advantage in the proposal made (originally, I think, by Mr Connell) to carry the flow-pipe as soon as possible to the summit level. This arises from the increments of expansion being greatest at the higher degrees of heat, and may be tested by calculations in different circumstances.

5th. Care must always be taken to have no lodgment of air in any part of the pipes, else the most certain circulation may be checked or stopped. Probably this was the cause of failure of J. S. W.'s apparatus, for in small-bore pipes a bubble of air often fills the pipe like a plug, and, owing to capillary attraction, resists even considerable pressure to move it.

J. B. K.



'THE BRAYTON VINE SPORT.

REFERENCE has more than once been made in 'The Gardener' to a Trebbiano Vine at Brayton Hall, Cumberland, which has for several years borne some bunches of grapes, the berries of which have been of extraordinary size for that, or indeed, any other variety. The other bunches on the same Vine have not exceeded in size of berry what Trebbiano usually grows to when well managed. When visiting Brayton this autumn I saw one bunch on this Trebbiano Vine that I certainly would never have taken for that Grape. On inspecting this bunch closely, I could think of no Grape it so much resembled in size and shape of berry as Golden Champion. The berries were immense; some of them I measured by applying a pair of compasses, and found them $1\frac{3}{8}$ inch in diameter, and, of course, something more in length. The berries in many cases showed a tendency to spot and crack just as Golden Champion frequently does. The Vine is growing on its own roots, and has never been grafted with Golden Champion or any other Grape, so that "gemmules" could not get into it in that way. This sport seems to be more persistent at Brayton than at Culford, inasmuch as it has appeared for several successive years at the former, while, so far as I know, it has not appeared a second time at the latter place. It also protested against being sent from Culford to Tweed Vineyard.

TRAVELLER.

FRUIT-CULTURE.

I THINK I may answer the questions put to me by "Learner," and also make a few concluding remarks upon the merits of the subject lately under discussion between myself and J. S. W. together, as both are a part of the same subject. With regard to "Learner's" question, I may be allowed to state that I desire to be courteous even to a "masked junior;" and while I congratulate my young friend upon his shrewdness and subtlety, I also hope to be able to satisfy his "curiosity" upon the point he has raised. Let me, however, remind "Learner" that there is such a thing as "setting a sprat to catch a mackerel," and that in doing so there is just the possibility of losing both.

"Learner" wishes to know why, after I say the produce from a 5-inch pot is equal in all respects to that of a 6-inch pot, I go on to state that for "all round work" nothing surpasses the 6-inch size. The answer is simple. It is because there is hardly one place in twenty where labour is over-plentiful, and, of course, the 6-inch pots do not require the same amount of watering as the 5-inch, for obvious reasons. I shall be surprised if it is proved that I enumerated Sir Charles Napier in the list of those varieties that I have forced in 5-inch pots. If so, it has been an oversight, as I have invariably found that only those varieties that will bear hard forcing will succeed well in small pots, and my memory must be treacherous if I included Sir Charles Napier in the number.

I have next to express my surprise that the discussion on "Fruit-Culture" between J. S. W. and myself should have collapsed so suddenly after my last paper in 'The Gardener' for September. I hope the idea of my sending out a "seedling" Strawberry for which J. S. W. stood horticultural sponsor at Leeds has not frightened him out of the field.

W. HINDS.

[This controversy may now be discontinued.—Ed.]



ORCHARD-HOUSE FRUIT-CULTURE.

I SHALL feel obliged if some of your correspondents who are able and willing should give their experience on the culture of Peaches, Pears, Apples, &c., in pots under glass. Several gentlemen have made inquiries at me about this, and being myself unable to give an answer, it has occurred to me to ask for information through your columns. One gentleman asks if it would be advisable, and likely to prove satisfactory, to erect an orchard-house, without any artificial heat whatever,

for Pears, Apples, Plums, and the ordinary outdoor fruits? I understand he proposes to grow them in pots, but it might be well to consider whether that or planting them in the soil would be the better course. Another gentleman suggests that the best form of an orchard-house might be discussed. He himself inclines to the idea of having a semi-span house running east and west, but the back wall, as it were, to be entirely of glass. Some doubts are expressed about the advisability of having wide houses 20 feet and upwards, for fear that those trees placed in the middle of the house may be too far from the glass, and the fruit not get properly ripened. Is there anything in this?

Probably in consequence of the late unfavourable season, the interest in fruit-culture under glass seems at the present time to be spreading; and as I am sure some of your numerous and able correspondents can throw much light on the subject, I hope you will give this a corner in your next issue.

A. D. MAKENZIE.

2 GROVE TERRACE,
EDINBURGH, *November 8, 1879.*

[A very interesting and important subject, and we shall be glad to have the experience of our correspondents.—ED.]



SCOTTISH HORTICULTURAL ASSOCIATION.

THE monthly meeting was held in the hall, 5 St Andrew's Square, Edinburgh, on Tuesday evening, the 4th ult.—Mr Dunn presiding. Twelve new members were admitted, and the names of six others were given in for admission at next meeting. Mr L. S. Dow read a paper on the "Cultivation of Roses in Pots," dealing chiefly with Hybrid perpetual sorts, and describing the treatment he had adopted to obtain specimens measuring 4 feet in diameter, and bearing from 60 to 100 blooms. The chief features of this consisted of careful potting in good loam, enriched with well-rotted cow-manure, efficient drainage, and liberal supplies of liquid manure while the plants were in active growth. The plants were placed in a sunny exposure out of doors in summer, and when introduced into the forcing-house for early blooming, heat should be very gradually applied. Great vigilance should at all times be exercised in looking after insects, particularly aphids, to the attacks of which the Rose was particularly liable; and mildew, another of its deadliest enemies, but which he had found readily to yield to sulphur, if applied immediately after its appearance. He concluded by recommending all who had the opportunity, to get a Rose-house, and hoped soon to see more attention paid to the culture of Roses in pots. Mr Hugh Fraser next read a paper on "Cape Heaths." After dwelling at some length upon the decorative qualities of these plants, and pointing out that, by a judicious selection of species and varieties, it was possible to have a show of bloom all the year round, he recommended those who were anxious to grow Heaths well either to devote a house to themselves,

or to allot a portion of the greenhouse to them separate from the general collection. Pure peat, with the addition of more or less sand, according to its natural character, was the proper soil. It should be chopped up with the spade, and only used when dry. All the sorts delight in charcoal; and a liberal allowance of small pieces mixed with the soil and among the crocks would be found beneficial. Great care should be exercised in watering, as they were more impatient than most plants of either excessive drought or moisture. They were liable to the attack of mildew, particularly in winter, or in long-continued dull weather; and an occasional gentle dusting of sulphur at such times would prevent it doing serious damage. The strong-growing, or what are known as soft-wooded, sorts, such as *Hyemalis*, should be put out of doors in summer in an airy but sheltered situation; while those termed hard-wooded—of which *Massonii*, *Tricolor*, and *Ampullacea* are the types—should be put in frames where they can with facility be protected from heavy rains. No more fire-heat should be given than is necessary to keep out frost, most of the sorts being hardy enough to stand from 3 to 4 degrees without injury, but it is always safest to exclude it altogether. The concluding paper was read by Mr Mark King, Bonnington, the subject being “Interesting British Plants.” In the course of his introduction, he urged the importance of young gardeners acquiring a knowledge of botany, and quoted the opinions of eminent men in corroboration of his views. He afterwards described a number of native plants of horticultural interest, showing how they might with advantage be admitted to garden collections. Mr King illustrated his paper with a large collection of beautiful dried specimens mounted on sheets of paper. Interesting and instructive discussions followed the reading of the several papers, and at the close the usual votes of thanks were cordially tendered to their authors.

Of a large number of exhibits on the table, the following were most interesting: A collection of nine dishes of distinct Peaches, including fine examples of *Lady Palmerston*, *Osprey*, *Gregory's Late*, and *Prince of Wales*, along with four dishes of Currants, consisting of *Jackson's Mammoth*, *La Versailles*, *Raby Castle*, and *White Champagne*, from Mr Dunn, Dalkeith Gardens. Mr L. S. Dow, Saughton, had a double seedling *Primula sinensis* of considerable merit; from Mr Robertson Munro, Abercorn Nursery, a fine collection of Herbaceous Spikes, including several of the finest of the hardy perennial Asters—a family of plants invaluable for autumn blooming. Messrs Todd & Co. had some beautiful spikes of the Double Crimson Intermediate Stocks, which were very much admired. Messrs John Cowe, Metropolitan Cemetery, a new seedling Potato, which he described as a cross between the *Victoria* and *Regent*. Mr Webster, Gordon Castle, sent two Melons, which he stated, in an accompanying note, had been raised from seed brought from Khiva by Captain Burnaby. These were remitted to the Fruit Committee with a view to their being reported on at next meeting. Mr Hugh Fraser showed branches of *Colletia Bictonensis*, a curious South American hardy *Hamamelis Virginica*, in flower, and *Ptelea trifoliata*, in fruit—the latter interesting from its hardiness in Britain, and from its fruit being used successfully in France as a substitute for Hops in the manufacture of beer.

Calendar.

KITCHEN-GARDEN.

A PERIOD of fine weather having been experienced (which we trust has been general), will do much to forward crops which were in many cases suffering from continued cold drenchings. Weeds, too, were in some gardens having all their own way. The weather is always right for them. Seldom have we known an October more suitable for garden-work of all kinds; and the maturation of weeds, we observe, among cottagers' plots and on farming land, has been very prevalent. In grass-land we have found it a formidable operation to clear the park of Thistles, but in every case have made an effort to clear root and top. The allowing of such weeds as Thistles, Groundsel, and Dandelions to remain on the ground after they are cut over, is simply worse than useless. They ripen their seed, and it is wafted over the surface by the wind, and as carefully sown as if human hands had done it. Some gardens are not always free from objectionable practices. Where such weeds have seeded in gardens, it is well to trench deeply, so that they may be kept from vegetating. But they are not always annihilated by burying: after many years' deep concealment under the surface, they may be trenched up again to sun and air, and grow as freely as if they had recently been sown.

Ground becoming vacant should be trenched or dug as deeply as may be desirable for the crops which are to occupy the land next year. We know no crops which do not grow well on carefully-trenched ground; and on such ground there need be little fear of drought or injury from stagnant moisture. Drainage is, however, a most useful agent in improving the land, as well as making the district a healthy one. The hoe should be kept at work among all growing crops—especially Spinach, young Cabbage, Lettuce, Onions, &c. A battered, wet, and close surface is an active destroyer of such crops. Dustings of sifted coal-ashes round the plants is good protection, and helps to prevent frost from throwing them

out of the soil. Decaying leaves must be got rid of; they are objectionable in every sense. When Parsley is loaded with rough half-rotten leaves, a winter of much frost and wet is sure to do a deal of mischief. Last winter ought to be a warning to us, so that we may avoid being "caught napping." Give protection to Globe Artichokes by placing Fern-litter or dry ashes round the collars of the plants. Crowns of Rhubarb, Seakale, Chicory, and Asparagus for forcing ought to be covered—not that they would suffer from frost, but to facilitate the lifting of them when wanted to place in the forcing-pits, &c. Besides, it is better for all plants not to be taken suddenly from frost to heat.

All roots left in the soil, to be lifted as wanted, are better covered to exclude frost. This applies to Parsnips, Jerusalem Artichokes, and Potatoes left in the ground to retain the flavour of the earth: the so-called "new" ones especially are liable to injury from frost, and the drier they are kept the better. Cauliflower and Broccoli turning in for use should be looked over frequently, so that none be left in the frost. Pit-frames, out-houses, empty glass-structures (orchard-houses especially), may be turned to good account now. Endive, Lettuce, and all other tender plants coming into use, should have the aid of protectors. Young well-hardened plants for spring use will take little harm if the ground on which they are growing is dry and healthy. Ashes may be strewn along the rows of Peas and Beans which have been recently sown and are vegetating. More Peas may be sown on a border this month if there are not other means of raising them under protection. Earth-up Celery when weather allows: use litter or Fern as protection during severe frost, but it should be taken off as soon as a thaw sets in. A quantity of Celery, Leeks, and similar vegetables may be heeled in for use by the rubbish-heap,—and labour may then be saved in making the litter covering as orderly as in the well-kept garden. Wheeling of manure should have at-

tention. When frost sets in, turn composts, make stakes for Peas, &c., repair tools, pick over Onions and all roots in store, clean sheds, and perform every operation if weather prevents outdoor work from being forwarded.

Forcing of vegetables will now be general, and a regular supply can only be kept up by sowing and planting frequently. French Beans should be sown in pots (smaller than after the New Year) three parts filled with turfy loam (using proper drainage) every ten or twelve days, according to demands. The seed need not be sowed at this season—they can be thinned out after they vegetate, and the plants earthed up with light rich soil as they develop: a forcing heat of 60° is suitable at night. Sun-heat may always rise higher by 15°. Damping of the stems is often experienced when a moist atmosphere is kept, accompanied by a low temperature.

Water should be warmed to 70° before being administered to plants in heat. Fresh air for French Beans may be admitted when warm out of doors. Osborn's and Williams's are two good forcing French Beans. Gentle hotbeds for Carrots and Radishes should now be prepared—mix leaves and manure well together till they are "sweet:" a very mild bed suits these. The Radishes may be sown between the Horn Carrots; and when the former are ready for use, the latter will be coming forward, and require the space. Crowding and absence of air would soon render them useless. Keep up supplies of Mushrooms, Asparagus, Seakale, Chicory, and Rhubarb as demand requires. Tomatoes for early work should be kept growing with plenty of light and air. Those bearing fruit should be kept thin of growths and cropped lightly.

M. T.

FORCING DEPARTMENT.

Pines.—Suckers that were potted early in autumn will now have well filled their pots with roots; and as it is not desirable to shift them at this dull season, they must, especially if plunged over hot-air chambers, be carefully seen to in the way of watering, to prevent their becoming too dry, and so producing a stunted condition of growth, resulting in their starting into fruit with a higher temperature in spring. Look over them twice weekly and water such as are dry. The temperature should now be reduced to its minimum: in cold weather 55°, and in mild 60°, is quite sufficient. Keep the atmosphere from becoming arid by sprinkling the paths and placing evaporating troughs on the pipes. Give these young plants air every day when the heat touches 65°. If they have become crowded, replunge them, giving them more room; for an attenuated growth now defeats all efforts to make fine sturdy plants of them afterwards. Keep a moist atmosphere and a temperature of 70°, except in very cold weather, where fruits are still swelling off, and range the bottom-heat about 90°. Keep the soil steadily moist up to the point of colouring, when no more water should be given; for if ripened with too much moisture at this season, large

Pines especially are apt to become black at the heart before they are fully coloured. Where ripe Queens are required in May, a selection of the plants that are most likely to start without much growth should now be made, and placed by themselves in a light pit or pinery where there is a good command of heat, so that a night temperature of 70° can be kept up after the middle of the month without overheated pipes. Let them have a bottom-heat of 90°; and if they are very dry, give them a watering after they are plunged, but afterwards water very sparingly until they show signs of starting into fruit. After such a sunless summer these plants are more likely than usual to grow instead of fruit if freely watered. The remainder of the stock of fruiting plants should be kept quiet for the present, not allowing the night temperature to rise nor sink much below 60°, unless in very extreme weather. Suckers on stools of Cayennes in a Charlotte Rothschilds from which the fruits have recently been cut, should now be potted, and plunged in a bottom heat of 90°, in which they will soon root and make a most useful succession to earlier stock. The surest way of keeping up a continuous supply of Pines is to have sets of

plants in a good few different stages of growth.

Grapes.—Look over ripe Grapes at least twice weekly and remove all berries that are showing signs of decay, and let such bunches as exhibit a tendency to decay or shrivelling be sent to table first. Keep the night temperature at from 45° to 50°, according to the external temperature, and everything about the vinery dry. When a bright day occurs, put a little extra heat into the pipes and give air at front and top; but when it is wet or foggy, keep the house almost closed, with a little heat in the pipes to keep the air in motion. Where it is necessary to put plants in the vinery, it is much better to bottle the Grapes, placing them in a dry room with an equable temperature of about 45°. Cut the shoot off, as is common in the case of spur-pruning, leaving all beyond the bunch also, and place the bottom part in bottles of water with a few pieces of charcoal in each. Look to the bottles occasionally and make up the water, at the same time removing all signs of decaying berries. After the fruit are bottled, the Vines can be pruned, &c.; and plants requiring a cool airy place can be placed in the vinery, where such is a necessity. But vineries should never have plants in them that are very subject to insects, especially thrip or white-bug. Pot-Vines that are required to supply the earliest Grapes next season should now be started. If the weather is mild, they may be subjected to a temperature of about 55°, with a rise of 5° by day, till the buds begin to swell. Some forcers advocate starting pot-Vines at a much higher temperature till the buds burst into growth—by which means a step in earliness is gained, no doubt, but at the expense of an even and strong start. If a little bottom-heat can be applied, it will hasten their breaking; but this must not be too freely applied, or a root-growth at the expense of top-growth will be the result. Syringe the Vines with tepid water several times daily till the start, and keep them steadily moist at the root. All Vines from which the fruit are cut should now be pruned and put in order for starting in due course. Those who contemplate planting young Vines in new borders in spring, should have their Vines ordered or selected before

the best of them are all sold. Well-ripened Vines raised from eyes struck last spring we consider best for planting, and thorough ripeness and fine fibry roots are of much more importance than merely thick canes—which thickness often represents weakness. Soil, too, should be collected, weather permitting, for the borders—a moderately heavy loam, the top five or six inches of old pasture-land, being preferable. The site of the border should be thoroughly bottomed and drained, so that it be impossible for water to stagnate on it.

Peaches.—Peach-houses and trees being got in readiness for starting, as directed last month, may now have fire-heat regularly applied to them, if ripe Peaches are wanted by the 1st of May. If the weather be mild, begin with a night temperature of 50°; if cold, be content with a few degrees less. Allow a rise of 8° or 10° by day, when there is any sun, before giving air. Still, let hard forcing be avoided, or the wood-buds will get too much the start of the bloom-buds. Syringe the trees several times daily, and keep the air otherwise moist. See that the border is thoroughly moist before fire-heat is applied. Indeed, Peach borders should never be allowed to become very dry. Prune and tie succession trees. Where young trees are yet to plant, no time should now be lost in planting them. In making new borders, put no animal excrement nor leaf-mould in them, — $\frac{1}{2}$ cwt. of bone-meal and $\frac{1}{2}$ cwt. of half-inch bones to every 6 cubic yards of soil is all that should be mixed with it. The Peach likes a holding, firm, loamy soil, not over 2 feet deep, with the most thorough drainage.

Figs.—Where early Figs are produced from pots, a place should now be got in readiness to start them about the middle of the month. A light pit, with a bed of fermenting leaves, into which the pots can be plunged, with a bottom-heat of 80° and a night temperature of 50° to begin with, is the best place for an early start. Top-dress the pots with horse-droppings and bone-meal. Keep the soil moist, and syringe the trees three or four times daily. All trees not yet pruned and top-dressed should not be left any longer. When the summer's pruning has been judicious, little cutting is needed at this season.

Cucumbers.—See last month's Calendar. Avoid hard forcing in cold weather; and if a covering of canvas or frigidome can be applied to the glass, so much the better. Keep the air moderately moist, and see that the soil does not become over-dry where close to hot pipes. Do not allow the plants to bear heavily at this dull season. Give more or less air every day. In mild weather keep the heat at 70°; when very cold, a few degrees less.

Strawberries in Pots.—Put a quantity of these in heat, according to the stock of plants and room. We

prefer, for very early forcing, plants that are in 5-inch pots. If a fermenting bed of leaves in a light pit, on which the plants can be placed near the glass, can be afforded, it is an excellent place for starting them at this season. Begin with a heat of 50°, and give a little air every day. See that the stock of plants are where frost will not break the pots, and where at the same time they are cool and moist at the root. Worms in the pots should also be guarded against, and no plant with a worm about its roots should be placed in heat.



Notices to Correspondents.

All business communications and all Advertisements should be addressed to the Publishers, and communications for insertion in 'The Gardener' to David Thomson, Drumlanrig Gardens, Thornhill, Dumfriesshire. It will further oblige if all matter intended for publication, and questions to be replied to, be received by the 14th of the month, and written on *one side* of the paper only. It is also requested that writers forward their name and address, not for publication, unless they wish it, but for the sake of that mutual confidence which should exist between the Editor and those who address him. We decline noticing *any* communication which is not accompanied with name and address of writer.

L. A.—Send your name and address, and we will give you our opinion of the Grape you have sent.

T. FALKNER.—Give your soil a dressing of caustic lime. If the soil is light, make it firm, and make a puddle of equal parts soot, cow-manure, and mould, and dip the roots of the plants in it before planting.

A. M.—Grow your *Lilium* in three-parts maiden loam; top-spit from an old pasture, one part rotten cow-manure, and a sixth of the whole of sand. The same compost, with the addition of a little bone-meal, will suit for Pot-Vines.

R. McF.—We do not know of a society that adopts the rule you state, but we know of no particular objection to it. It will have a tendency to check the too common and disreputable practice of entering and not coming forward.

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